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GRAVITY ANOMALY SEPARATION USING 2-D WAVELET APPROACH AND AVERAGE DEPTH CALCULATION

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ABSTRACT: In this paper, 2-D Multi-Resolution Analysis (MRA) is used to perform Discrete-Parameter Wavelet Transform (DPWT) and applied to gravity anomaly separation problem. The advantages of this method are that it introduces little distortion to the shape of the original image and that it is not effected significantly by factors such as the overlap power spectra of regional and residual fields. The proposed method is tested using a synthetic example and satisfactory results have been found. Then average depth of the buried objects have been estimated by power spectrum analysis.

Keywords: *Wavelet, Gravity anomaly, Power spectrum analysis.*

ÖZET: Bu makalede, gravite anomalilerinin ayrım problemi için Discrete-Parameter Wavelet Transform (DPWT) 2-B Multi-Resolution Analizi (MRA) kullanıldı. Yüzeye yakın kürelerin ortalama derinliklerini bulmak için güç spekturum analizi kullanıldı. Yöntemin geçerliliğini test etmek için sentetik yapılar kullandık ve memnun edici neticeler bulduk. Gömülü cisimlerin ortalama derinliklerinin hesaplanması için güç spektumu kullanıldı.

Anahtar Kelimeler: *Dalgacık, Gravite anomalisi, Güç spekturum analizi.*

Geophysical maps usually contain a number of features (anomalies, structures, etc.) which are superposed on each other. For instance, a magnetic map may be composed of regional, local, and micro-anomalies. The aim of an interpretation of such maps is to extract as much useful information as possible from the data. Since one type of anomaly often masks another, the need arises to separate the various features from each other.

One of the main purposes of geophysical mapping is the identification of units that can be related to the unknown geology. On a regional scale, aeromagnetic and gravity maps are most useful tools presently available, although other techniques such as conductivity mapping (Palacky, 1986) or remote sensing (Watson 1985) are very helpful in locating lithologic boundaries. The interpretation which makes extensive use of enhanced maps of gravity data often involves initial steps to eliminate or attenuate unwanted field components in order to isolate the desired anomaly (e.g., residual-regional separations). These initial filtering operations include the radial weights methods (Griffin, 1989), least squares minimisation (Abdelrahman et al., 1991), the Fast Fourier Transform methods (Bhattacharyya, 1976) and recursion filters (Vaclac et'al, 1992) and rational approximation techniques (Agarwal and Lal, 1971).

Gravity anomaly separation can be effected by such wavelength filtering when gravity response from the geologic feature of interest (the signal) dominates one region (or spectral band) of the observed gravity field's power spectrum. R.S. Pawlowski et'al (1990) has investigated a gravity anomaly separation method based on frequency-domain Wiener filtering. S. Hsu et'al (1996) has presented a method for geological boundaries from potential-field anomalies.

In this paper, 2-D Wavelet is applied to gravity anomaly map on real time. This modern and real time signal processing approach is tested using synthetic examples and perfect results have been found. So we can offer 2-D wavelet as an alternative to classical gravity anomaly separation methods.

This paper is organised as follows. In Section II, Problem Statement at Gravity Anomaly Map is presented. In Section III, 2-D Wavelet Transforms and Multi-Resolution Analysis (MRA) is explained. In Section IV, Wavelet Application on Gravity Anomaly Map is tested using a synthetic examples and satisfactory results have been observed. In the last Section, average depth of the buried objects have been estimated using power spectral approach.

II. PROBLEM ST ATEMENT AT GRAVITYANOMAL Y MAP

Traditionally, magnetic and gravity maps are subjected to operations approximating certain functions such as second derivative and downward continuation (Pick et'al, 1973). Gravity data observed in geophysical surveys are the sum of gravity fields produced by all underground sources. The targets for specific surveys are often small-scale structures buried at shallow depths, and these targets are embedded in a regional field that arises from residual sources that are usually larger or deeper than

the targets or are located farther away. Correct estimation and removal of the regional field from initial field observations yields the residual field produced by the target sources. Interpretation and numerical modelling are carried out on the residual field data, and the reliability of the interpretation depends to a great extent upon the success of the regional-residual separation.

In literature some classical methods are proposed for the seperation of gravity maps. The simplest is the graphical method in which a regional trend is drawn manually for profile data. Determination of the trend is based upon interpreter's understanding understanding of the geology and related field distribution This is a subjective approach and also becomes increasingly difficult with large 2-D data sets. In the second approach, the regional field is estimated by least-squares fitting a low-order of the observed field (Abdelrahman et al., 1991) . This reduces subjectivity, but still needs to specify the order of the polynomial and to select the data points to be fit. The third approach applies a digital filters such as Wiener filtering to the observed (R.S. Pawlowski et'al, 1990).

In this study, one of the very update 2-D image processing technique, Wavelet approach is applied to gravity anomaly map and satisfactory results are observed.

III. 2-D WAVELET TRANSFORMS AND MULTI-RESOLUTION ANALYSIS

The wavelets, first mentioned by Haar in 1909, had compact support which means it vanishes outside of the finite interval, but Haar wavelets are not continuously differentiable. Later wavelets are with an effective algorithm for numerical image processing by an earlier discovered function that can vary in scale and can conserve energy when computing the functional energy. In between 1960 and 1980, mathematicians such as Grossman and Morlet (1985) defined wavelets in the context of quantum physics. Stephane Mallat (1989) gave a lift to digital signal processing by discovering pyramidal algorithms, and orthonormal wavelet bases. Later Daubechies (1989, 1990) used Mallat's work to construct a set of wavelet orthonormal basis functions that are the cornerstone of wavelet applications today.

A- Wavelet Transforms:

The class of functions that present the wavelet transform are those that are square integrable on the real line. This class is denoted as $L^2(R)$.

$$f(x) \in L^2(R) \Rightarrow \int_{-\infty}^{+\infty} |f(x)|^2 \, dx < \infty \qquad (1)$$

The set of functions that are generated in the wavelet analysis are obtained by dilating (scaling) and translating (time shifting) a single prototype function, which is called the mother wavelet. The wavelet function $\psi(x) \in L^2(R)$ has two characteristic parameters, called dilation (a) and translation (b), which vary continuously. A set of wavelet basis function $\psi_{a,b}(x)$ may be given as

$$\psi_{a,b}(x) = \frac{1}{\sqrt{|a|}}\psi(\frac{x-b}{a}) \qquad a, b \in R\,; a \neq 0 \qquad (2)$$

Here, the translation parameter, "b", controls the position of the wavelet in time. The "narrow" wavelet can access high frequency information, while the more dilated wavelet can access low frequency information. This means that the parameter "a" varies for different frequencies. The continuous wavelet transform is defined by

$$W_{a,b}(f) = < f, \psi_{a,b} > = \int_{-\infty}^{+\infty} f(x)\,\psi_{a,b}(x)\,dx\,. \qquad (3)$$

The wavelet coefficients are given as the inner product of the function being transformed with each basis function.

Daubechies (1990) invented one of the most elegant families of wavelets. They are called compactly supported orthonormal wavelets, which are used in discrete wavelet transform (DWT). In this approach, the scaling function is used to compute the ψ. The scaling function $\phi(x)$ and the corresponding wavelet $\psi(x)$ are defined by

$$\phi(x) = \sum_{k=0}^{N-1} c_k\ \phi(2x-k) \qquad (4)$$

$$\psi(x) = \sum_{k=0}^{N-1} (-1)^k\ c_k\ \phi(2x+k-N+1) \qquad (5)$$

where N is an even number of wavelet coefficients, c_k, k= 0 to N-1. The discrete presentation of an orthonormal compactly supported wavelet basis of $L^2(R)$ is formed by dilation and translation of signal function $\psi(x)$, called the wavelet function. Assuming that the dilation parameters "a" and "b" take only discrete values. $a = a_0^{\,j}$, $b = k b_0 a_0^{\,j}$. Where $k, j \in Z$, $a_0 > 1$, and $b_0 > 0$. The wavelet function may be rewritten as

$$\psi_{j,k}(x) = a_0^{\,-j/2}\,\psi(a_0^{\,-j}x - k b_0) \qquad (6)$$

and, the discrete-parameter wavelet transform (DPWT) is defined as

$$\mathrm{DPWT(f)} = < \mathrm{f}, \psi_{\mathrm{j,k}} > = \int_{-\infty}^{+\infty} \mathrm{f(x)} a_0^{\,-\mathrm{j}/2} \psi(a_0^{\,-\mathrm{j}}\mathrm{x} - \mathrm{k}b_0)\mathrm{dx} \qquad (7)$$

The dilations and translations are chosen based on power of two, so called dyadic scales and positions, which make the analysis efficient and accurate. In this case, the frequency axis is partitioned into bands by using the power of two for the scale parameter "a". Considering samples at the dyadic values, one may get $b_0 = 1$ and $a_0 = 2$, and then the discrete wavelet transform becomes

$$\mathrm{DPWT(f)} = < \mathrm{f}, \psi_{\mathrm{j,k}} > = \int_{-\infty}^{+\infty} \mathrm{f(x)} \{2^{-\mathrm{j}/2} \psi(2^{-\mathrm{j}}\mathrm{x} - \mathrm{k})\}\mathrm{dx}\,. \qquad (8)$$

Here, $\psi_{j,k}(x)$ is defined as

$$\psi_{j,k}(x) = 2^{-j/2}\psi(2^{-j}x - k), \qquad j,k \in Z \tag{9}$$

B- Multi-resolution Analysis (MRA)

Mallat (1989) introduced an efficient algorithm to perform the DPWT known as the Multi-resolution Analysis (MRA). It is well known in the signal processing area as the two-channel sub-band coder. The MRA of $L^2(R)$ consists of successive approximations of the space V_j of $L^2(R)$ There exist a scaling function $\phi(x) \in V_0$ such that

$$\phi_{j,k}(x) = 2^{-j/2}\phi(2^{-j}x - k); \quad j,k \in Z \tag{10}$$

For the scaling function $\phi(x) \in V_0 \subset V_1$, there is a sequence $\{h_k\}$,

$$\phi(x) = 2\sum_k h_k \, \phi(2x - k). \tag{11}$$

This equation is known as two-scale difference equation. Furthermore, let us define W_j as a complementary space of V_j in V_{j+1}, such that $V_{j+1} = V_j \oplus W_j$ and $\bigoplus_{j=-\infty}^{+\infty} W_j = L^2(R)$. Since the $\psi(x)$ is a wavelet and it is also an element of V_0, a sequence $\{g_k\}$ exists such that

$$\psi(x) = 2\sum_k g_k \, \phi(2x - k) \tag{12}$$

It is concluded that the multiscale representation of a signal *f(x)* may be achieved in different scales of the frequency domain by means of an orthogonal family of functions $\phi(x)$. Now, let us show how to compute the function in V_j The projection of the signal $f(x) \in V_0$ on V_j defined by $P_v f^i(x)$ is given by

$$P_v f^i(x) = \sum_k c_{j,k} \, \phi_{j,k}(x) \tag{13}$$

Here, $c_{j,k} = \langle f, \phi_{j,k}(x) \rangle$. Similarly, the projection of the function *f(x)* on the subspace W_j is also defined by

$$P_w f^j(x) = \sum_k d_{j,k} \psi_{j,k}(x) \tag{14}$$

where $d_{j,k} = \langle f, \psi_{j,k}(x) \rangle$. Because of $V_j = V_{j-1} \oplus W_{j-1}$, the original function $f(x) \in V_0$ can be rewritten as

$$f(x) = \sum_k c_{j,k} \, \phi_{j,k}(x) + \sum_j^{J-1} \sum_k d_{j,k} \, \psi_{j,k}(x) \qquad J > j_0 \tag{15}$$

The coefficients $c_{j,k}$ and $d_{j,k}$ are given by

$$c_{j-1,k} = \sqrt{2} \sum_i h_{i-2k}\ c_{j,k} \tag{16}$$

and

$$d_{j,k} = \sqrt{2} \sum_j g_{j-2k}\ c_{j,k}\,. \tag{17}$$

The multiresolution representation is linked to Finite Impulse Response (FIR) filters. The scaling function ϕ and the wavelet ψ are obtained using the filter theory and consequently also the coefficients are defined by these last two equations. If at $x=t/2$, $F\{\phi(x)\}$ is considered and

$$\Phi(\omega) = H\left(\frac{\omega}{2}\right)\Phi\left(\frac{\omega}{2}\right) \tag{18}$$

As $\phi(0) \neq 0$, $H(0)=1$, this means that $H(\omega)$ is a low-pass filter. According to this result $\phi(t)$ is computed by the low-pass filter $H(\omega)$. The mother wavelet $\psi(t)$ is computed by defining the function $G(\omega)$ so that $H(\omega)G^*(\omega) + H(\omega+\pi)G^*(\omega+\pi) = 0$. Here, $H(\omega)$ and $G(\omega)$ are quadrature mirror filters for MRA solution.

$$G(\omega) = -\exp(-j\omega)H^*(\omega+\pi) \tag{19}$$

Substituting $H(0)=1$ and $H(\pi)=0$, it yields $G(0)=0$ and $G(\pi)=1$, respectively. This means that $G(\omega)$ is a high pass filter. As a result, the MRA is a kind of two-channel sub-band coder used in the high-pass and low-pass filters, from which the original signal can be reconstructed.

Since a major potential application of wavelets is in image processing, 2-D wavelet transform is a necessity. The subject, however, is still in an evolving stage and this section will discuss only the extention of 1-D wavelets to the 2-D case. The idea is to first form a 1-D sequence from the 2-D image row sequences, do a 1-D MRA, restore the MRA outputs to a 2-D format and repeat another MRA to the 1-D column sequences. The two steps of restoring to a 2-D sequence and forming a 1-D column sequence can be combined efficiently by appropriately selecting the proper points directly from the 1-D MRA outputs. As seen in Figure 1, after the 1 –D row MRA, each lowpass and highpass output goes through a 2-D restoration and 1-D column formation process and then move on to another MRA. Let t_1 and t_2 , be the 2-D coordinates and L=lowpass, H=highpass. Then the 2-D separable scaling function is

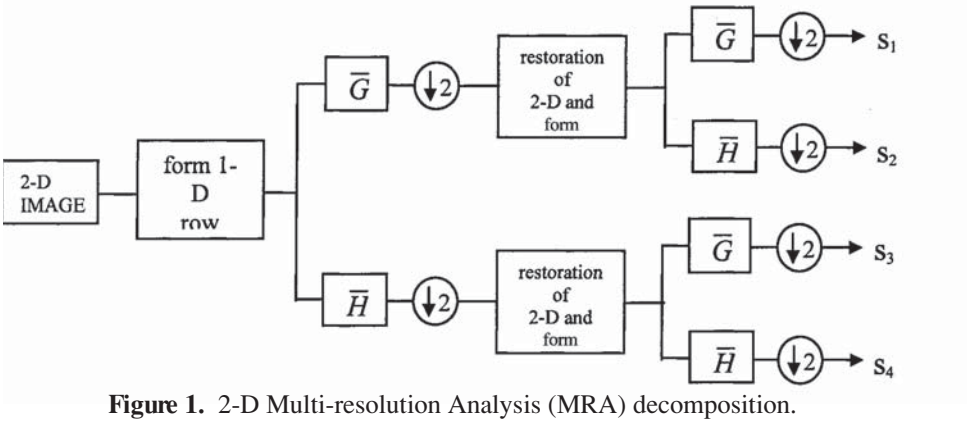

Figure 1. 2-D Multi-resolution Analysis (MRA) decomposition.

$$\phi^{(1)}(t_1,t_2)=\phi(t_1)\phi(t_2)\ , \quad LL \tag{20}$$

original signal can be reconstructed. Then 2-D separable wavelets are

$$\psi^{(2)}(t_1,t_2)=\phi(t_1)\psi(t_2)\ , \quad LH \tag{21}$$

$$\psi^{(3)}(t_1,t_2)=\psi(t_1)\phi(t_2)\ , \quad HL \tag{22}$$

$$\psi^{(4)}(t_1,t_2)=\phi(t_1)\phi(t_2)\ , \quad HH \tag{23}$$

with the corresponding wavelet coefficients s_2 , s_3 and s_4.
It is easy to verify that the $\psi^{(i)}$ are orthonormal wavelets, i.e.,

$$\iint\psi^{(i)}(t_1,t_2)\,dt_1\,dt_2=0 \tag{24}$$

$$<\psi^{(i)}_{mn},\psi^{(i)}_{kl}>=\delta_{m-k}\,\delta_{n-l} \tag{25}$$

The scheme of separable 2-D processing, while simple and uses available 1-D filters, has disadvantages when compared to a genuine, 2-D MRA with non-separable filters. The latter possesses more freedom in design, can provide a better frequency and even linear phase response, and have non-rectangular sampling.

IV. WAVELETAPPLICATION ON GRAVITYANOMAL Y MAP

In this section, we have tested our proposed approach to some synthetic data and perfect results have been obtained. All the units used in examples are normalized values. In the first example (Table I) four spherical structures are used. For increasing regional effects on Bouguer anomaly map (Figure 2), the big sphere with the biggest radius is replaced deeper than the others. Also to increase the residual effect, the other spheres are closer to the ground. At wavelet output, the residual map is extracted satisfactory as shown in Figure 3.

Parameters	sphere 1	sphere 2	sphere 3	sphere 4
Coordinate (x,y)	(32,32)	(44,42)	(24,40)	(30,26)
h	100	5	4	4
r	30	4	4	3
ρ (gr / cm^3)	1.8	1.2	1	1.3

Table 1 : Parameters of Bouguer anomaly map of an Example.

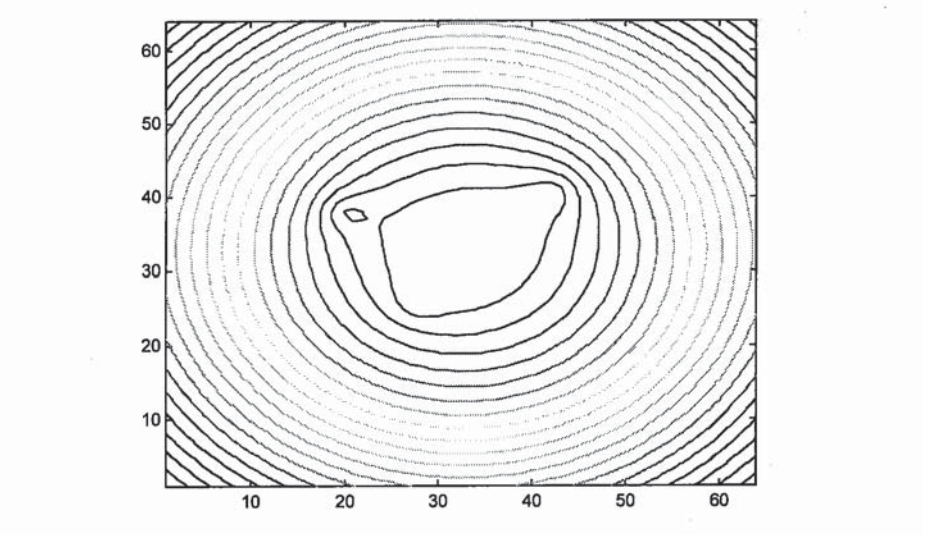

Figure 2. Bouguer Anomaly of four spheres with parameters as in Table I.

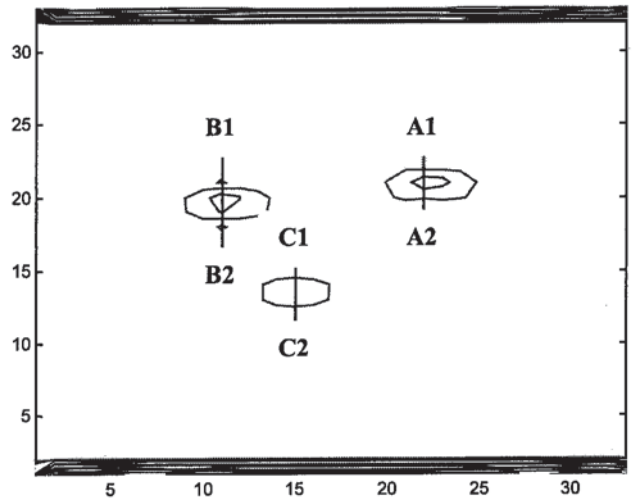

Figure 3. 2-D Wavelet output of the Bouguer Anomaly given in Figure 2 (Level 2, Daubechies 2).

V. DEPTH ESTIMATION USING POWER SPECTRAL PROPERTIES

One of the main researches on gravity anomaly maps is to estimate the average depth of the buried objects resulting the anomaly. In interpretation of gravity anomalies by means of local power spectra, there are three main parameters to be considered. These are, depth , thickness and density of the disturbing bodies. In direct interpretation, the information such as the maximum depth at which the body could lie and depth estimates of the centre of the body are obtained directly from the gravity anomaly map. It is clear that infinite number of different configurations can result in identical gravity anomalies at the surface and in general, gravity modelling is ambigous. In indirect interpretation the simulation of the causative body of the gravity anomaly is computed by simulation. The variables defining the shape, location, density etc. of the body are altered until the computed anomaly closely matches the observed anomaly. As it is well known potential fields obey Laplace's equation which allows for the manipulation of the gravity in the wavenumber domain. Many scientists have used the calculation of the power spectrum from the Fourier coefficients to obtain the average depth to the distırbing surface or eqivalently the average depth to the top of the disturbing body (A. Spector and Grant 1970).

It is necessary to define the power spectrum of a gravity anomaly in relation to the average depth of the disturbing interface. It is also important to point out that the final equations are dependent on the definition of the wavenumber in the Fourier transform. For an anomaly with n data points the solution of Laplace equation in 2D is,

$$g(x_j,z) = \sum_{j=0}^{n-1} A_k e^{i2\pi k x_j} \; e^{\pm 2\pi k z} \qquad (26)$$

where wavenumber k is defined as $k = 1/\lambda$ and A_k are therefore the amplitude coefficients of the spectrum,

$$A_k = \sum_{j=0}^{n-1} g(x_j,z)\, e^{-i2\pi k x_j} \; e^{\pm 2\pi k z}. \qquad (27)$$

for z=0, equation (27) can be written as,

$$(A_k)_0 = \sum_{j=0}^{n-1} g(x_j,0)\, e^{-i2\pi k x_j} \; . \qquad (28)$$

Then equation (27) can be rewritten in terms of (28) as,

$$A_k = (A_k)_0 \, e^{\pm 2\pi k z}. \qquad (29)$$

Then the power spectrum Pk is defined as,

$$P_k = (A_k)^2 = (P_k)_0 \, e^{\pm 4\pi k z}. \qquad (30)$$

Taking logarithm of both sides,

$$\log_e P_k = \log_e (P_k)_0 \pm 4\pi\ kz \tag{31}$$

we can plot wavenumber, k, against $\log_e P_k$ to attain the average depth to the disturbing interface.

The interpretation of the $\log_e P_k$ against wavenumber k requires the best fit line through the lowest wavenumbers of the spectrum. The wavenumbers included in this procedure are those smaller than the wavenumber where a change in gradient is observed. Then average depth can be estimated from plotting of Equation (31) as,

$$\bar{h} = \frac{\Delta P}{4\pi \Delta k} \tag{32}$$

where $\bar{h}$ is the average depth, ΔP and Δk are derivative of P and k respectively.

In this paper, we have estimated the spheres depths using power spectral approach with high accuracy as shown in Figures (4-6).

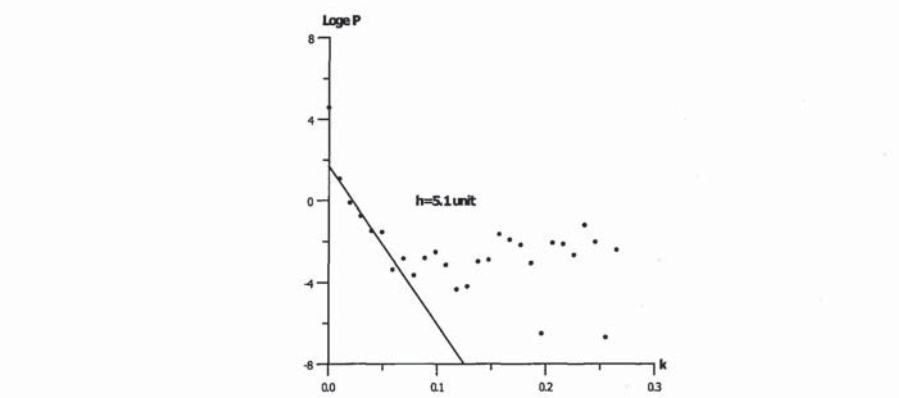

Figure 4. Power Spectral Density of the sphere-2 in Table I (cross-section A1-A2).

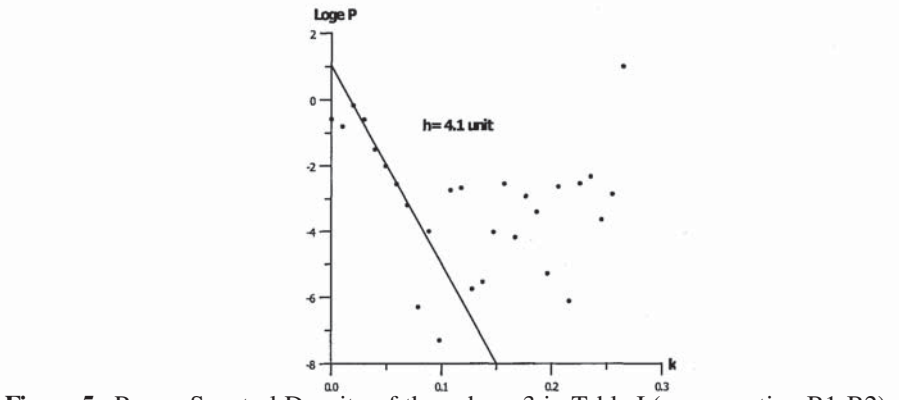

Figure 5. Power Spectral Density of the sphere-3 in Table I (cross-section B1-B2).

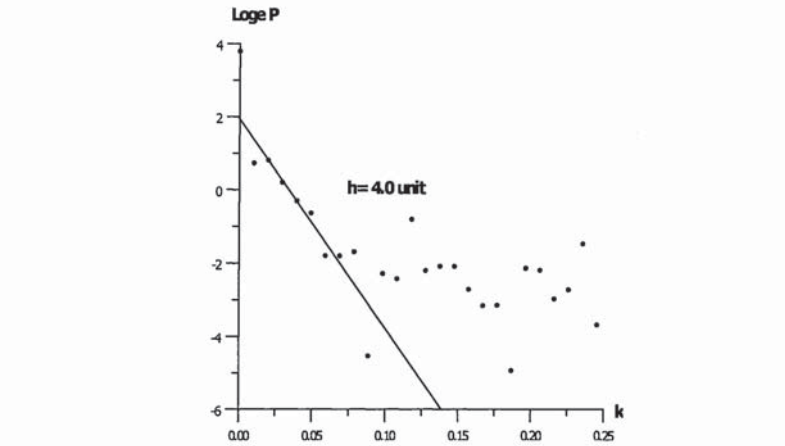

Figure 6. Power Spectral Density of the sphere-4 in Table I (C1-C2).

VI. CONCLUSION

In this paper, wavelet approach has been applied to gravity anomaly separation problem. The proposed method is tested using a synthetic example and satisfactory results have been found. Then average depth of the buried objects have been estimated by power spectrum analysis.

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ANTAGONIST CHARACTERS IN THE EARL Y GOTHIC NOVEL: A MATTER OF POLITICAL ANXIETY?

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ABSTRACT : During the eighteenth-century, the antagonist, previously the second most important character in a story, becomes, first in Richardson's Clarissa, and then under Gothic influence, the main character in the novel. This recalls the "heavy" villain of Elizabethan drama. The use to which the character is put by the author is both consciously and unconsciously political or ideological, at least in part. Under political influence, the antagonist can be classified as either "repentant" or "unrepentant," with very different effects, as a New Historicist or Cultural Materialist analysis can reveal. The Gothic antagonist is set within the Gothic novel, and together with other conventions of the Gothic novel became the basis of later interpretations of the Gothic impulse in novels of various sub-genres, from oriental fiction and science fiction to the modern romance novel.

Keywords: *Antagonist, Gothic novel, villain, New Historicist, Cultural Materialism, ideology, genre, fiction, romance.*

ÖZET : Bir öykünün karşıt karakteri (antagonist), yani, ikinci önemli karakteri, önce Richardson'un ellerinde birinci önemli karakter konumuna yükselir; daha sonra da Gotik etki altında ana karakter konumuna çıkar. Bu durum Elizabet Çağı Tiyatrosunun "kötü adamının" ulaştığı o yüksek konumu çağrıştırır. Karakterin yazar tarafından bu şekilde kullanımı bilinçli veya bilinçsizce politik etki altındadır veya en azından ideolojiktir. Yeni Tarihçi veya Kültürel Maddeci yorumsal irdelemelerin de gösterdiği gibi, karşıt karakter (antagonist) politik etki altında ise "pişmankar" veya "meydan okuyucudur". Gotik karşıt karakter doğu yazınından, bilim-kurguya ve modern romanslara kadar çok çeşitli alt türlerdeki gotik dürtünün temelini oluşturarak diğer Gotik roman gelenekleri ışığında yorumlanır.

Anahtar Sözcükler: *Gotik, Gotik roman, gotik karşıt karakter (antagonist)*

With the coming of Samuel Richardson, the epistolary novelist, the writing of characters in the early novel became more concerned with motivation and psychological processes on the part of certain main characters within the larger context of a story. Indeed, in this regard, Richardson's Pamela (1741) is considered by many to be the first true novel in English. Richardson's Pamela pits a heroine, a main character, against an antagonist, a morally dangerous man, while his Clarissa (1748) pits the heroine, Clarissa Harlowe, against a villain, Lovelace, who is more fully developed psychologically, so much so that with Lovelace the antagonist might be said in this case to have merged with the protagonist and become, if not the hero or heroine, at least, and this is significant, the most important character in the novel. Sympathy, however, and a clear sense of moral justification is still reserved for the hero/heroine (the "good guy"). The main characteristics of Lovelace in Clarissa are also those of Manfred in The Castle of Otranto (1765), considered the first Gothic novel. Indeed, it appears that Walpole combined the obsessive personality of Lovelace with the "graveyard" scene and mood of Tobias Smollett (Roderick Random, 1748) to create his tale of horror. Of course the graveyard mood and a "heavy" villain both predate the novel. But as novelists, it may be said that both Smollett and Richardson anticipated in their turn key aspects of the Gothic novel.

Lovelace's literary descendent is the Gothic villain. Gothic villains, as especially strong antagonists in eighteenth-century novels, owe their development both to contemporary social pressures and to the influence of earlier evil characters, and can be characterized as either *repentant or unrepentant*. These villain characters, as drawn by their eighteenth-century authors, were a product of their time, and were used to encourage morality and ideologically "correct" behavior. In fact, the typical eighteen-century villain character, as seen in Clarissa, in the Castle of Otranto and in Ann Radcliffe's Gothic novels, The Mysteries of Udolpho (1794) and The Italian (1797), functions sociologically as an index of Puritan heritage and continued social influence.[1]

As a wicked or evil antagonist to the hero or heroine, the villain in the early English novel is typically a strong but ambiguous character, and developed in his specific attributes as a result, in part, of the failure of Tudor-Stewart society. His ambiguity reflects the changing state of popular ideology during the shift from royal to constitutional government and from a local to an international economy. An analysis of the villain as a function of Puritanism is a Cultural Materialist undertaking which also facilitates an analysis of Puritan society in broadly economic and ideological terms. This undertaking allows one to bring a range of post-structuralist techniques to bear on the novel to demystify and deconstruct the ideological assumptions of the authors and their contemporary readers as well. At the same time, the continued appearance of such characters in English literature illustrates the continued influence of Puritan attitudes in society. Ideology plays a key role in the creation and perception of the villain character, while villain characters also play a key role in the creation and perception of ideology.

Broadly speaking, by beginning with an anthropological and structuralist methodological framework based upon both the work of the Prague Circle of structural linguistics and also on the structural anthropology inspired by Claude Levi-Straus, an analysis of the villain character can effectively respond to the specific application of Cultural Materialist theory based upon the work of Raymond Williams and Terry Eagleton, and to a specific historical analysis of British class structure and religion. Such an approach constitutes an "archeology of the text" along post-structural lines following the work of Louis Althusser. Ian Watt and Michael McKeon have laid the groundwork for demystifying the ideological role of the novel and indeed literacy itself in Puritan society.

Analytical Presuppositions

The word is the sign, and so, in order to establish the epistemological assumptions which allow deconstruction to proceed, we begin with the word "villain" itself as a term which reveals, *through a series of conspicuous absences*, the very ideology the authors of the early novel may have wished to hide. What is signified by "villain" has shifted quite a lot over the past three hundred years, and these shifts in meaning and signification parallel changes or shifts in the ideological culture of Britain. As the term is used by eighteenth-century authors in works of fiction and in popular commentary about such works of fiction, the term "villain" carries with it the residual effects of outmoded aesthetic ideologies, such as feudalism and "the divine right of kings." But it would be too simple to suggest that Richardson was unaware of such a shift. In fact it is quite clear, upon examination of the political ideologies of Richardson's creative time (the years either side of the 1745 Stuart rebellion—the last gasp of "divine right of kings"), and upon closer inspection of the aesthetic ideologies ranging from the time of Daniel Defoe's writing (c. 1720) to the time of Lord Byron's work (c. 1820), that the term "villain" and the villain characters are both deployed by authors to have a very specific effect upon the English readers during a politically turbulent time.

To understand the historical and cultural context of the early novel we must step back to the previous ideological paradigm, locate the sign, "villain," and then step back again into the eighteenth century, taking with us a sense of what was signified by the seventeenth-century term, which itself is still laden with outmoded but sensible significations from the sixteenth-century sign, "villain" or "villein." Identifying the various ideological strands involved in the use of the term in any age ultimately requires us to trace the term to its original use, "villein": signified here is a type of proto-bourgeois and rural small landowner. This class was, from an aristocratic perspective, relatively "low" and plebian, and yet carried a certain respectability of being tied by a free status to the land, but this sense of the term is lost in the contemporary eighteenth-century usage and understanding of the term "villain." The memory of these agricultural freemen as a class of Englishmen was demonized by the new bourgeois aristocratic classes after 1540 and especially after the Restoration in 1660. Hence the use of the term "villain" to denote wickedness. This was the result of country vs. city economic competition. This shift in the

treatment of the villain class from sponsorship under Tudor-Stuart Paternalism to villification by the victors of the Civil War marks a nodal shift from the paternalism towards capitalism. The subsequent rise of the Whig squire oligarchy as now *owners* of land and as rental agents and *evictors* demanded the destruction and the concomitant demonization of the whole villain class, which stood in the way of capitalist agricultural development, which was the goal of the new bourgeois farmer-squire. Politically this change was marked by the end of the Stuart kingdom and the importation by the English bourgeois class of, first, the Dutch Oranges and then of the German Hanovers. Progressive solidification of the economic and political foundations of bourgeois ideology allowed a transition also from a more purely religious understanding of Puritanism to one more overtly political, beginning with the English Civil War.

History is important: we can assert that it is important to the creation of villain characters by authors when we assert that villain characters are produced by and also influence political and economic factors in society, especially in terms of political and economic competition. There are several types of villains found in English novels, and there are social, historical and ideological factors contributing towards the literary construction of villains. In Cultural Materialist and indeed in New Historicist terms, the type of villain created, seen in differentiated economic terms and relative to contemporaneous economic subgroups in society. There are villain characters in different periods: They are always indicators of certain social phenomena first appearing in early modern England.[2] The foundation of sovereignty in England went through a change from the "old" aristocracy associated with the Stuarts, through the period of gentry oligarchy between 1688 and 1760, to the "new" aristocracy and the "new" Tory party associated with the House of Hanover. This change produced social contradictions which have an effective literary index in the villain character: here we link the ideological unease and political unrest associated with this longer period with the aesthetical response made by authors producing villain characters in literary works for a specific contemporary readership. Within this historical contest such villain characters, villainous, evil, can be viewed as images or reflections of that which might otherwise be hidden by the "smooth" construction of a purely narrative legitimacy on the part of a contemporary party or oligarchy. With authors as agents of the Institutional State Apparatuses (ISA's), such groups in all periods will attempt to *establish themselves aesthetically as a means of also establishing themselves politically*. However, cognizance of this literary-ideological process allows us to effectively reverse it by analyzing the changing aesthetical construction of the villain as an image of the changes in the social formation itself, both generally and in terms of specific villain characters.

The early novels in English literature include the works of Daniel Defoe (Robinson Crusoe, 1719; Moll Flanders, 1722), Samuel Richardson (Pamela, 1741; Clarissa, 1748), Henry Fielding (Joseph Andrews, 1742; Tom Jones, 1749); Tobias Smollett (Roderick Random, 1748; Peregrine Pickle, 1751; Ferdinand Count Fathom, 1753), and also the first Gothic novels, the beginnings of a new sub-genre, starting in 1765

with the publication of Horace Walpole's Castle of Otranto. Of these, a number contain characters we tend to distinguish as "villains": strong characters who have importance that reaches beyond the impact of their actions alone, their very personalities making them figure centrally as determinants of the course of the narrative. All of these villains are, as they were constructed or created at the time, male figures, but the "bad" actions of the villain are typically resisted by a "good" heroine, an oppressed but heroic female protagonist persecuted by the villain.

On a surface level, the villain character is easy to identify: descriptive words come to mind: "base," "treacherous," "vicious," "scoundrel" and "criminal." Villains appear as devilish men cast as "the other" in dualistic literary constructions created for us by authors. A villain is, quite simply, "a bad man." Yet, as we have seen, this usage of the term is difficult to understand when we consider that before the days of Milton and the English Civil War in the seventeenth century, the word "villain" (villein) referred to a feudal tenant who possessed a free status: not a serf in the normal sense, but a "freeman." Today our "villain" stereotype is not at all that of a rural farm worker. Clearly, this term has undergone an abrupt change of meaning at some point in the cultural and linguistic past, specifically in the years prior to the Restoration (1660).

In New Historicist terms, the villain character is dynamic: we are interested in what the character tells us about society, and we are interested in his direct impact on society itself. We are concerned, in other words, with the effects of literature, because literature can often strongly influence the way people participate in their society. For example, though literature is art, as often as not, the art that affects the readers most—and even most subtly—is simply the art of persuasion. As art, literature's purpose is understood to be more than to educate and more than to entertain: It is to do both by involving us profoundly in an awareness of "good taste." However, the heightened personal awareness that accompanies a sense of good taste also reassures us of our continued participation in an identity as individuals who stand for something either for or against what other people themselves stand for. In other words, while the aesthetic appreciation of literature is pleasing, it is also self-justifying in the sense that it involves one in a personal identity that depends upon a sense of group membership, however small it might be. This group membership conveys an implicit "us vs. them" mentality which is always present within an individual appreciation or aesthetic awareness of literature. Such group identity rewards us by giving the changing conditions of our lives the illusion of continuity through the construction of a relatively static category for knowing others that we control. Such aesthetic construction as occurs in works specifically about literary aesthetics is similar to that found in other texts, such as historical narratives, all of which together contribute to what John Bender, in Imagining the Penitentiary, described as an "ongoing process of cultural construction" (Bender, 1987:3). This way of knowing others is also perhaps our chief way of knowing ourselves.

Any shift from a consideration of literature within a personal context, one pertaining to aesthetical recognition and to solitary acts of individual choice, to a consideration

of literature within a societal context, one involving a literature within its own full linguistic community, requires us to consider the total nexus of individual users of a language, including both those who actually read the literature in question and those influenced by those who read. Within such a context, literature has the potential to influence the life of the whole community by influencing individuals in their perception of group identities within that community. Such group identity or membership may obscure the fact that there is a larger community at all.

Because it directly influences group identity, a literary text's aesthetic agenda, the sense of "taste" the text espouses, is inherently political or ideological. The influence of aesthetic sensibility can thus extend beyond the personal to the societal to such an extent that literature and politics within a linguistic community mutually affect one-another. As Michael Shapiro points out in Language and Political understanding, a number of contemporary literary critics have recognized this link between the social and the literary realms in calling for a political analysis of language "that uncovers the political presuppositions inherent in language" (Shapiro, 1981: 24). Most critical studies in this area are interdisciplinary, drawing on diverse philosophical positions and social theories. In his essay "Critical Developments," Jonathan Dollimore attributes these inter-disciplinary approaches in literary criticism to the influence of "a range of intellectual perspectives in post-war Europe, including anthropology, post-structuralism, Marxism, deconstruction, psychoanalysis, feminism, and cultural studies" (Dollimore, 1990: 406-407).

A Transhistorical Constant?

The antagonist is a literary constant as a metaphor, but unique to his time in his particulars. The refers to an analysis of villain characters from literary works of the seventeenth, eighteenth and nineteenth centuries and builds upon the political and cultural analysis of early-modern English literature by such writers as Raymond Williams and Terry Eagleton. One can add to this a specific analysis of the villain from an especially anthropological point of view in an effort to historicize a character usually treated as an a-historical literary figure. For instance, a socio-historical perspective associated with Marxist literary criticism can be used in a consideration of the villain character and his eighteenth-century reader, but also one can apply to the "repentant" villain a methodology derived directly from the structural anthropology of Mary Douglas (Purity and Danger), while to the "unrepentant" villain a methodology might be used that is derived in part from cultural materialism and in part from Marxist structuralism. The villain has been treated as a transhistorical figure, while "villainy" as a cultural concept has been usually treated as if it were a kind of a-historical constant. The point is that specific insights from cultural anthropology, Cultural Materialism and New Historicism offer a profitable alternative analysis which "unlocks" quite a lot of information that suggests certain links between literary character development and political tensions.[3] While it is often attractive to treat the villain a-historically, this typical treatment of the villain tends to mask specific political content which might lie behind such transhistorical constructions, which are actually based upon analogies drawn

between periods and zeitgeists. Such transhistorical conceptualizations of the villain fail to recognize the importance of ideology as, first, an influence on the creation of specific villains, and, second, as a real influence, via the villain, in the institutionalized socio-political indoctrination of contemporary readers.

The transhistorical conceptualization of the villain is only true as a kind of cultural metaphor, and only works when the authors and readers willingly make or accept broad analogies between periods and villains. Such analogy is of course a dynamic cultural practice associated generally with enculturation, and should be recognized as such by the critic interested in understanding the process and impact of ideological factors in literature. The approach to the problem of interpreting the villain character as a social or cultural artifact reflects a desire to benefit from the range of approaches mentioned above, while also regaining some of the distance and perspective which favors a more characteristically anthropological conceptualization of culture or cultural ideology over a more superficial conceptualization of culture as describing political trends or as describing simply that which is conceived as being socially contemporaneous.

The political analysis of literary aesthetics can be applied to texts specifically about literary aesthetics or to narrative texts in which some overall aesthetic assumption (the high brought low, the villain punished) plays a major role in the movement of the action (disorder to order, innocence to experience), as is the case in novels, drama or in narrative poetry. Political analysis of a text's aesthetics has significance beyond the personal and momentary: such analysis can unlock the text's ideology, helping us the "place" the text vis-à-vis other dynamic factors in the social structure.

When engaged in the political analysis of literary aesthetics, one examines a text against its context as a response, as an expression of ideology and as an agenda or attempt at influence within its linguistic community. The assumption here is that the aesthetic content of a text has a political or sociological dimension which goes hand-in-hand with its ability to please or entertain a reader, a subconscious underside which, when demystified and understood, can point the way to and understanding of the powerful persuasive agendas which underlie all literature.

Discussing the relationship between aesthetics and ideology, Terry Eagleton in his book Criticism and Ideologypoints out that "it is essential to examine in conjuncture two mutually constitutive formations: The nature of the ideology worked by the text and the aesthetic modes of that working" (Eagleton, 1976:79). Even in overtly aesthetic modes—as in the case of texts about literary aesthetics—the ideological content is only a little closer to the surface. Even the author may not be fully cognizant of the impact or implication of what he is doing as he writes: A literary text's ideological content inheres unselfconsciously in every literary expression as it is produced or articulated. Not only is ideology a key factor in the literary process, but given its apparent omnipresence, it may even be viewed a s the active agent in literary production. In other words, ideology inheres in the aesthetic structure, while it is the aesthetic that gets the first attention of the reader. These "aesthetic modes"

thus simultaneously both produce and partially hide the ideology of the text. The relation the literary text bears both to the ideology that produces it and to the ideology it produces is that, as Eagleton again points out:

> Ideology pre-exists the text; but the ideology of the text defines, operates and constitutes that ideology in ways unpremeditated, so to speak, by the ideology itself (Eagleton, 1976: 80).

Perhaps we can begin to understand why demystification of a text's relationship to ideology is both necessary and often progressively difficult, there being several manifestations of ideology implicit under the aesthetic modes of the text: The former ideology pre-existing the test, the ideology promoted in the aesthetic structure of the text itself, and the ideology presumably to develop in society as a result of publication, partially as a reaction to the influence of the text on the ideational construction of individual and group identity on the part of the readership.

The social and the ideological are of course closely linked, the more so because ideological concerns play such an important role in our minds as we construct ourselves as social beings. As a body of ideas held by an individual, an ideology reflects one's needs and aspirations within the context of a culture. Having an ideology is a precondition to social participation, and when enough people snare such needs and aspirations, the corpus of ideas used to justify these needs constitutes their "cultural ideology." As Jean E. Howard points out in "The New Historicism in Renaissance Studies," literature can contribute to the formation or modification of a cultural ideology. This is especially true in a society with a high rate of literacy:

> Rather than passively reflecting an external reality, literature is an agent in constructing a culture's sense of reality. It is part of a much larger symbolic order through which the world at a particular historical moment is conceptualized and through which a culture imagines its relationship to the actual conditions of its existence. In short, instead of a hierarchical relationship in which literature figures as the parasitic reflector of historical fact, one imagines a complex textualized universe in which literature participates in historical processes and in political management of reality (Howard, 1987: 15).

In its social effects, the importance of literature might be said to be the way it produces ideology for a linguistic community of readers, that is, for a society which may comprise several ideological sub-cultures. We can use a literary text to explore the fundamental assumptions through which a society is or was structured in the minds of its constituents, as something on which to ground our re-construction of social meanings, and as a foundation for understanding the influence of cultural ideology. We can accomplish this by first "contextualizing" a work—not generally against its historical background, but more specifically in terms of sub-groups and then by situating a hypothetical reader from a given time, as an individual, in an effort to establish his particular relationship to his (or her) society in terms of the fundamental social assumptions we find evident in a given text (the influence of the character). Keeping the specific autonomy of character and author foregrounded in our minds, we begin in advance with the assumption that though they may use facts, texts are not themselves factual so much as they are persuasive in their use of such

facts. Understanding this, we can chose to consider a literary product such as the antagonist or villain character, as an artifact, not so much of an historical event or literary period, but more specifically of an ideological attitude. As Howard puts it:

> …the ideological is omnipresent; it inheres in every representation of reality and every social practice, as all of these inevitably confirm or naturalize a particular construction(s) of reality. Consequently, there is no way in which ideology can ever be absent from literature, any more than it can be absent from any discursive practice (Howard, 1987: 18).

A Political Villain orAntagonist

Literary villains exist at the simultaneous juncture of the religious, the moral, and the social. Their evil is not necessarily a simple or absolute thing: it is relative to their behavior in either the moral or the religious arenas, and through these, in the social arena. The political should not be separated from the social because, as Mary Douglas has shown, political influences are not restricted to formal political institutions, but are "diffused through the whole system" (Douglas, 1966: vii). Villains are defined by the "evil" they do, but there is a difference between the deed itself and the attitude we take toward it. In other words, villains are defined by how evil others consider them to be: they are evil by consensus. Their evil in not ultimately based on their own assessment of themselves, though as characters they may indulge in self-judgement and even self-castigation.

True villain can be identified because they are "big" as well as "bad." In other words, they get attention for their own sake as much as they do for the part they play in a story. For instance, as a kind of villain, the identity of Shakespeare's Iago is tied to the plot in Othello (1604), whereas Macbeth is well-known as a "heavy" character fully significant in his own right in the famous Shakespeare tragedy of that name (1606).[4] In the former case our main interest in the villain is in what he did, in the latter our interest is in who he is. In this connection, the villain as a "heavy" character resembles such tragical figures as Christopher Marlowe's Dr. Faustus (1594), who in his brooding interior monologues anticipates Milton's Satan in Paradise Lost (1667)as well as certain similarly ambitious and willful characters from the Elizabethan stage.[5] After Macbeth, villains as heavy characters develop through epic poetry (Milton's Satan), the early novel (Richardson's Lovelace) and on into the Gothic realm, where the "heavy" villain becomes at last the normative example of the type for future generations of writers, for instance for writers of the Gothic.[6]

Corresponding with the development of this type of individually-significant villain are two momentous occurrences in terms of British political ideology and de facto state power: the death of the paternalist state of the Tudors and their relations the Stuarts (the last British monarchs continuous in both blood and outlook with the feudal past), and the rise of the Whig squire oligarchy (and later aristocracy) built first around the "elected" bourgeois monarchy of William of Orange (Netherlands) and later around the imported monarchy of the House of Hanover (Germany). These

political developments in eighteenth-century England correspond with literary treatments of religion and morality such as those also concerning the villain in the early novel. Illumination of these correlations reveals strategies of class dominance and political ascendancy exercised in the writing of the novel. Ideological changes influencing the literary construction of the villain including the progressive secularization of political and also the change in the conceptualization of what it meant to be "Puritan." "Puritan" was less and less a noun describing a group, and was more and more an adjective describing supposed cultural traits: it somehow still described an influence. This Puritan disembodiment was a cultural strategy, a way of self-description that avoided calling attention to the change that had taken the Puritan from an overtly political and religious faction in the seventeenth century to one in the eighteenth century which would like to assume that its political hegemony is beyond debate, and would rather therefore be preoccupied with morality and respectability as vaguer but more powerful tools for its ruling oligarchy.

Given the overtly political nature of the former Puritan radicalism of the English Civil War period (mid-seventeenth century), we may account for the moralistic Puritanism of the aristocracy of the Whig era (mid-eighteenth century) reflected in Richardson's novels as a second manifestation of Puritanism more involved in up-scaling the bourgeois side and emphasizing a judgmental Calvinism (such as in the case of Richardson) that easily translated into the politics of exclusion and aristocratic privilege. This privilege was analogous but not equivalent to the privilege of the former aristocratic system of the Tudor-Stuart period, and its textual dissemination as morality served to keep a secular Puritan economic domination in place. These "new" Puritans differed from previous revolutionary puritan in that morality as bourgeois respectability was central to their sense of political justification.

The earlier "repentant" villains of Richardson and Walpole are fundamentally different from the villainous or heavy characters socially anathematized seen in the works of Radcliffe and later Byron. The latter are distinctive in relation to society in that they remain socially unrepentant through the end of the story. The repentant villain of Richardson and Walpole is on the other hand at some point unequivocally sorry for his villainy. Take, for instance, the final moments of Schedoni in Radcliffe's The Italian (1797). The "evil" priest, the son of an impoverished nobleman, pursues schemes and intrigues with the powerful for purposes of his own advancement. He is also guilty of Murder. In his attempts to ruin the young son of a duke, he finds that his own daughter's fate is ironically tied to that of the youth he opposes. Though he quickly adjusts his schemes to match the welfare of his newly discovered "daughter," he nevertheless finds himself in the dungeons of the Italian inquisition. There he suffers horribly for his crimes against society and finally dies, but not before he successfully poisons a rival priest, whom he confronts in his final moments with a terrible stare. Schedoni's own demise is marked with none of the familiar attempts at didactic moralizing that had formerly distinguished the repentant villain.

Just as Ambrosio, as a repentant priest in Monk Lewis' The Monk (1796) reflects anti-Catholic feelings on the part of a late-eighteenth-century audience, Schedoni, as an "evil" confessor (priest), is an easy target for English prejudice against something they don't understand and are as well traditionally taught to fear: the international network and "sovereign" power represented by the Roman Catholic Church. For instance, Victor Sage in his study Horror Fiction in the Protestant Tradition relates the creation of Radcliffe's villainous priest to anti-Catholicism and anti-clericalism in late-eighteenth-century England. Specifically, in his view, Radcliffe's priests are a form of "Protestant" propaganda against the ideological threat posed by Catholics on the Continent and the time of the French Revolution (Sage, 1988: 20). However, such propaganda must also be understood as predicated by the need on the part of the general English reading public for a literary mode of political justification vis a vis England's own final rejection, by the beginning of the Industrial Revolution, and under questionable circumstances, of the House of Stuart (political side) and England's own Catholic past (religious side).

Shedoni is a hard man dying a hard death, and in this he serves on some level as a parable for the death of the defunct but still not completely forgotten sovereignty which distinguished the past politically and socially in relation to the present: a hard, unrepentant priest or king is worthy of respect, but it is respect as a distance of time or geography by a now firmly established constitutional government in England. Though the domestic rivals of the English constitutional settlement of 1688 (whether, they be radical Puritans or Old Tory Aristocrats) are long dead, there are nevertheless very real political rivals still to be found across the channel in France and the Continent. Here the Napoleonic Wars also suggest or remind the English that it is to France that the Stuarts fled at the end of the former political system. The successful ideological rejection of such rivals still required a form of political justification provided, through a process o aesthetical transference, by the unrepentant villain.

Radcliffe's The Mysteries of Udolpho (1794) takes as its subject Montoni, a character reminiscent of Manfred, the villain in the first Gothic tale, The Castle of Otranto (1764). As Donald Spector points out regarding Radcliffe's work in his introduction to Seven Masterpieces of Gothic Horror:

> To an age that sought release, from the mundane, everyday activities, she brought respectable escape. She united terror and beauty. If the reader felt uncomfortable while enjoying the liberation of sadistic and masochistic impulses, he was comforted by the passages of scenic splendor, the final morality, and the ultimate assurance of realism and reason (Spector, 1963: 6).

In "Gothic Heroes," Howard Anderson sees the difference between Lewis' Ambrosio and Radcliffe's Schedoni as a difference of degree rather than of type (Anderson, 1982: 206). He also discusses the difference between Manfred and Montoni as a difference between Walpole's grater use of the psychological in Manfred (the inside) versus Radcliffe's greater use of the pictorial (the outside) (Anderson, 1982: 212), in terms of the degree to which a character is "developed" (Anderson, 1982: 210) or in terms of what a character "learns" (Anderson, 1982: 206). From a social or political

standpoint, however, the distinctive feature of Montoni, for instance, is how unrelenting he proves to be as a defiant and arrogant leader of banditti: he is unwavering and unrepentant, though he is, in the end, defeated by the forces of law and sensibility.

The political origin and cultural impact of both repentant villains such as Lovelace and unrepentant villains such as Montoni would suggest that the problem of sovereignty and traditionality were fundamental to the formulation of the character. For instance, in his introduction to The English Hero, 1660-1800, Robert Folkenflik points out that Richardson "had to present a critique of some traditional conceptions in the person of Lovelace" (Folkenflik, 1982: 18). The root of the problem was the crisis in determining legitimate political authority between the Parliamentarians (and later the Constitutionalists) and those who supported the Stuarts: since the early Middle Ages, sovereign authority in tribal-regional England had resided in a sacral monarchy by tradition, but within the political context of a regionally-based peerage. But, as Christopher Hill points out in Reformation to Industrial Revolution, "fifty-seven persons had better hereditary claims to the English throne than George I: It was impossible to take divine right monarchy seriously after his succession" (1714). The surprising thing is how long such questions remained viable issues, and how long they continued to be reflected in English literature. As our survey of unrepentant villains suggests, such politically inspired characters stretch from Milton at the time of the English Civil War and the Restoration (1660) throughout the eighteenth century, and even effected the Romantic movement in the early nineteenth century, as reflected in Byron's personal and literary career as late as 1824.

Between the Glorious Revolution in 1688 and the Napoleonic Wars at the beginning of the nineteenth century, the old Regime associated with the ideological remnants of Tudor-Stuart paternalism were replaced with a new economic and political order which stressed money and capital investment by *rentier* capitalists and entrepreneur agents over the former more static landed aristocracy.

The repentant villain character was first defined, in the course of the plot, in large part by means of a socio-structural process of exclusion. This exclusion, or rejection, an important part of the basis of the tale, is in effect until his repentance and rapprochement. Unrepentant villains are defined by a different process. The unrepentant character carries a certain amount of newly discovered distance by exchanging the immediacy and moral/ideological particulars we saw behind the creation of Richardson's Lovelace with philosophical perspective and emotional poignancy. A historical travel narrative such as Radcliffe's The Mysteries of Udolpho or The Italian also became a metaphor for something ideologically far away in space and time: the social formations, including religion, which had upheld an agrarian ideology and political economy based dynamically on Tudor-Stuart paternalism. The "Gothic priest," for instance, was considered as an appropriate topic now for the novel because he was easily associated into the general category of defunct ideologies of the past in the mind of the late eighteenth-century reader

now safely able to engage in political nostalgia: the former battle that had marked the repentant villain was over, it had lost its immediacy, and the reader born into a time of constitutional consensus and institutional government was free to explore and vicariously justify his personal and emotional stake in his society's final break with the political idea of what Carlyle later called government by a "strong, just man."

The unrepentant villain Schodoni thus represents something new, something different from the earlier repentant villain, who as a character could be described as a self-fulfilling bourgeois prophesy, where the villain in the end joins with the bourgeoisie. Yet there is still even here in the unrepentant villain, the expectation of repentance, the understanding that they should repent, and a kind of shock or disbelief on the part of the hero/heroine when such villains fail the "play fair" (in establishment terms) and this too makes the unrepentant villain discussed here a bourgeois phenomenon. An unrepentant villain in literature could not be tolerated by the English middle class reading public until the real danger posed by the political ideologies behind such characters had passed: Yet the Catholic church, once the greatest of political threats (The Spanish Armada of 1588, the seventeenth-century religious wars), can by Radcliffe's time be safely indulged and mined for all its mysterious and titillating strangeness and fro its ability to entertain a now less-reactionary English reader.

The villain as a character in eighteenth-century works becomes "villainous" since he embodies a now outmoded connection to the land and to "duty," while the valorized classes of the new time were those moneyed classes engaged in trade and politics. In Clarissa, Richardson's dynamic relationship between Clarissa Harlowe's family and the family of Lord "M," the relative of Lovelace, is one of implicit social competition, a competition between an empty, feared class on the one hand—Lord M and Lovelace his representative—and on the other hand a valorized, emerging class, the rich, bourgeois Harlowes. Richardson's aim was to use the character of Lovelace as a repentant villain in order to allow readers to "purge" him as a representative of a correspondingly failed aesthetic and political/ideological system which nevertheless has left dangerously subversive traces in Richardson's contemporary culture. Lovelace is the first important and popular villain character in the early English novel, and it is no accident that he is drawn as a "repentant" character in the early English novel. Later in the eighteenth century we see the villain character drawn more shockingly and blatantly as *unrepentant* in Gothic novels and also in Byron's Manfred. Whereas the repentant villain *was made to* exhibit remorse for his actions (and by implication for his social position) vis-à-vis the newer classes, by writers and readers of the newer classes, out of a public need for a symbolic purging, fifty years later an *unrepentant* villain was allowed to be seen as unmitigated evil. England was safe enough in its new politics to allow English readers a chance to give full purge to dark fantasies rooted in the relative medievalism of the former sovereign order of Stuart and Scottish Royalty and paternalism.

Whereas there was enough public uneasiness over the shift of economic and social underpinning after the Restoration to require a villain whose complexity permitted, in fact demanded (it was suggested as inevitable), his ultimate acceptance into the contemporary political and aesthetic ideological order, by the end of the eighteenth century the shift was complete enough that no such complexity was needed. The complexity of the repentant villain allowed Richardson to create the first psychologically complex novel, while the unrepentant villain, being relatively one-dimensional, allowed the latter-eighteenth-century author to play with the residual fears and terrors of the bourgeois class in the writing of the Gothic novel, where, as Marx noted, speaking of all Europe: "the tradition of all the generations of the dead weighs like a nightmare on the brain of the living" (Marx, 1963: 1). This would also seem to apply to England.

The fundamental and definitive content of the Gothic, beyond the often discussed "subterranean psychological landscape" of ruined castles, ghosts, dark passages and unseen danger is the ideological underpinning so aptly noted by Marx. The terror of the Gothic is a free kind of terror enjoyed by a class which is socially valorized but which lacks a clear sense of justification for its privileged status at the top of the socio-economic pyramid of the capitalist class system. Being Puritan at its base, it must constantly examine itself to determine if a tenuous "elect" status is or is not confirmed by God at any given moment. This is an ongoing process of anxiety which mirrors the anxiety which mirrors the anxiety of economic activity by the bourgeois class; it must be successful, and yet it is a kind of justification which still sits uneasily against the self-evident sovereignty of the previous royal period—from whence the horrific and Gothic writers continue to draw their characters.

Notes

1. See my The Villain Character in the Puritan World (Diss. U of Missouri, 1995).

2. I have adopted the period designation "early modern England," as well as the inclusive dates from J.A. Sharpe's Early Modern England: A Social History, 1550-1760. (London: Edward Arnold, 1987).

3. See e.g. Robert B. Heilman's Tragedy and Melodrama (Seattle: U of Washington P, 1968) p.83.

4. See Walter J. Ong's discussion of "heavy" characters in Orality andLiteracy (New York: Methuen, 1982) pp. 45 and 69-70.

5. See Clarence Valentine Boyer, The Villain as Hero in Elizabethan Tragedy. (New York: Russell and Russell, 1964) p. 79.

6. See Devendra P. Varma, The Gothic Flame(New York: Russell and Russell, 1966) pp. 191-192.

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AFİNOR ALANLARIN HORİZONTAL LİFTİNİN NİJENHUİS-SHİROKOV TENSÖRÜ HAKKINDA

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ÖZET: Bu çalışmada almost kompleks yapının Nijenhuis tensörünün almost cebirsel yapılara genişlemesi olan Nijenhuis-Shirokov tensörü invaryant formda verilmiş ve bu tür tensörler tanjant demette incelenmiştir. Tanjant demette horizontal lift yardımıyla oluşan almost cebirsel yapının Nijenhuis-Shirokov tensörünün sıfıra eşit olmasını sağlayan şartlar bulunmuştur.

Anahtar Kelimeler: *Tensör, afinor alan, tanjant demet, horizontal lift.*

ABSTRACT: The main purpose of the present paper is first of all to study Nijenhuis-Shirokov tensors for an almost algebraic structure and then to apply the results to the study of tangent bundles.

Key words: *Tensor, affinor field, tangent bundle, horizontal lift.*

1. Giriş

M_n, C^∞ sınıfından n-boyutu diferensiyellenebilen bir manifold, A_m , m-boyutlu birimli, değişmeli, birleşmeli cebir olsun. M_n manifoldu üzerinde alınmış (1,1) tipli tensör (afinor) alanlarının herhangi kümesi $\prod$ olsun. Eğer $\prod \leftrightarrow A_m$ izomorfizmi varsa $\prod$-yapıya almost cebirsel yapı denir. A_m cebirinin bazı $\{e_\alpha\}$ olmak üzere, karşılık gelen $\underset{\alpha}{\varphi} \leftrightarrow e_\alpha$ afinorları için

$$\underset{\alpha}{\varphi}\,\underset{\beta}{\varphi} = C^{\gamma}_{\alpha\beta}\,\underset{\gamma}{\varphi}$$

yazılır. Burada $C^{\gamma}_{\alpha\beta}$, A_m cebirinin yapı sabitleri, $\underset{\alpha}{\varphi}\,\underset{\beta}{\varphi}$ ise $\underset{\alpha}{\varphi}$ ve $\underset{\beta}{\varphi}$ afinorlarının kontraksiyonlu çarpımıdır. Koordinatlarla bu çarpım $\underset{\alpha}{\varphi}{}^{i}_{m}\,\underset{\beta}{\varphi}{}^{m}_{j}$ olarak gösterilir.

2. Nijenhuis-Shirokov Tensörü

M_n manifoldu üzerinde $(1,q)$ tipli tüm tensör alanlarının kümesini $\mathfrak{I}^1_q(M_n)$ ile gösterelim. $\mathfrak{I}^1_q(M_n)$, $F(M_n)$ (M_n manifoldu üzerindeki C^∞ sınıfından olan tüm fonksiyonlar cebiri) üzerinde bir modül oluşturur.

$t \in \mathfrak{I}^1_q(M_n)$ tensör alanı ve $\forall \underset{\alpha}{\varphi} \in \prod,\ \alpha = 1,...,m,$ için aşağıdaki şart sağlanıyorsa, t tensör alanının almost cebirsel yapıya göre pür tensör alanı denir:

$$\varphi(t(X_1,...,X_q)) = t(\varphi X_1,...,X_q) = ... = t(X_1,...,\varphi X_q)\ \ \forall X_1,...,X_q \in \mathfrak{I}^1_0(M_n).$$

Kabul edelim ki, $\psi \in \mathfrak{I}^1_1(M_n)$ almost cebirsel yapıya göre bir pür afinor alanı olsun. Bu afinora uygulanan Nijenhuis operatörüne bakalım [1],[2]:

$$(\Phi_\varphi\psi)(X,Y) = \varphi[\psi Y, X] + \psi[Y,\varphi X] - [\psi Y,\varphi X] - \psi\varphi[X,Y]. \tag{1}$$

Almost cebirsel $\prod$ -yapısı için $Q_{\varphi,\psi}(X,Y),\ \forall \varphi,\psi \in \prod$ Nijenhuis-Shirokov tensörü

$$Q_{\varphi,\psi}(X,Y) = [\psi X,\varphi Y] - \varphi[\psi X, Y] - \psi[X,\varphi Y] + \psi\varphi[X,Y] \tag{2}$$

biçiminde tanımlanır [3]. (1) ve (2) denklemlerinden

$$Q_{\varphi\psi}(X,Y) = -(\Phi_\varphi\psi)(Y,X) \tag{3}$$

bulunur.

Özel durumda, eğer $\varphi = \psi$ ve almost cebirsel $\prod$-yapı almost kompleks yapı ise $(\varphi^2 = id)$ $Q_{\varphi,\varphi}(X,Y) = -N_\varphi(Y,X)$ Nijenhuis tensörü bulunur ve (3) eşitliğinden de $N_\varphi(X,Y) = -N_\varphi(Y,X)$ özelliğine göre

$$(\Phi_\varphi\varphi)(X,Y) = N_\varphi(X,Y)$$

olduğu yazılır [2].

Nijenhuis tensörü almost kompleks yapının, Nijenhuis-Shirokov tensörü ise almost cebirsel yapının integrallenmesi problemlerinde önemli rol oynar.

3. Tanjant Demette Nijenhuis-Shirokov Tensörü

M_n, n-boyutlu C^∞ sınıfından diferensiyellenebilir manifold olsun. M_n manifoldu üzerinde

$$T(M_n) = \bigcup_{p \in M_n} T_p(M_n)$$

tanjant demet ve $\pi : T(M_n \to M_n \quad (\tilde{p} \to p)$ tabii izdüşümü verilmiş olsun. M_n manifoldunun U koordinat komşuluğunun p noktasındaki lokal koordinatlar $x^h, h = 1,...,n$ olmak üzere $T(M_n)$ tanjant demette $\pi^{-1}(U)$ koordinat komşuluğundaki indirgenmiş lokal koordinatlar $(x^h, y^h) = (x^h, x^{\bar{h}}), \bar{h} = n+1,...,2n$ olarak alınır. Burada $x^{\bar{h}} = v^h \quad T_p(M_n)$ tanjant vektör uzayında ki $\tilde{p}$ vektörünün $\{\partial_h = \frac{\partial}{\partial x^h}\}$ bazında koordinatlarıdır. Lokal koordinatlarda $M_n : x^{j'} = x^{j'}(x^j)$ koordinat dönüşümüne karşılık $T(M_n)$ tanjant demette koordinat dönüşümü

$$\begin{cases} x^{j'} = x^{j'}(x^j) \\ y^{j'} = A^{j'}_j y^j, \ A^{j'}_j = \dfrac{\partial x^{j'}}{\partial x^j}, \ y^j = x^{\bar{j}} \end{cases} \tag{4}$$

biçiminde olur. (4) dönüşümünün Jacobian matrisi

$$\left(\frac{\partial x^{J'}}{\partial x^J}\right) = \begin{pmatrix} \dfrac{\partial x^{j'}}{\partial x^j} & \dfrac{\partial x^{j'}}{\partial x^{\bar{j}}} \\ \dfrac{\partial x^{\bar{j}'}}{\partial x^j} & \dfrac{\partial x^{\bar{j}'}}{\partial x^{\bar{j}}} \end{pmatrix} = \begin{pmatrix} A^{j'}_j & 0 \\ \dfrac{\partial^2 x^{j'}}{\partial x^j \partial x^i} y^i & A^{j'}_j \end{pmatrix} \tag{5}$$

olarak yazılır.

M_n manifoldunun U koordinat komşuluğunda keyfi $w = w_i dx^i$ 1-formu verilmiş ise $\pi^{-1}(U)$ da indirgenmiş koordinatlarda lokal ifadesi $\imath w = w_i y^i$ biçiminde olan fonksiyonu tanımlanır.

M_n manifoldu üzerinde X vektör alanı verilmiş olsun. w keyfi 1-form olmak üzere $T(M_n)$ tanjant demette

$$^v X(\imath w) = {}^v(w(X)) \tag{6}$$

olarak tanımlanan X vektör alanına X vektör alanının vertical lifti denir. X vektörünün $T(M_n)$ tanjant demette vertical liftinin bileşenleri

$$^v X : \begin{pmatrix} {}^v X^h \\ {}^v X^{\bar{h}} \end{pmatrix} = \begin{pmatrix} 0 \\ X^h \end{pmatrix} \tag{7}$$

olarak verilir. (7) ifadesiyle tanımlanmış vertical liftin tanjant demette bir vektör alanı olduğu (5) ile verilen Jakobian matrisinin yardımıyla da gösterilebilir.
Sonuç olarak (7) denkleminden

$$\begin{cases} {}^{v}Xf = 0,\ {}^{v}(X+Y)={}^{v}X+{}^{v}Y \\ {}^{v}(fX)={}^{v}f\,{}^{v}X,\ X,Y \in \Im_0^1(M_n), f \in \Im_0^0(M_n) \end{cases} \tag{8}$$

elde edilir. Ayrıca X ve Y keyfi vektör alanları olmak üzere (7) denkleminden Lie parentezi için

$$[{}^{v}X,{}^{v}Y] = 0 \tag{9}$$

elde edilir.

Diğer taraftan M_n diferensiyellenebilir manifoldunda Γ_{ij}^k katsayıları ile ∇ afin konneksiyonu verilmiş olsun. M_n manifoldunda keyfi tipli S tensör alanının $T(M_n)$ tanjant demetdeki horizontal lifti

$${}^{H}S={}^{c}S - \nabla_{\gamma}S \tag{10}$$

olarak tanımlanır [4, s.94]. Burada ${}^{c}S$-tam lifti gösterir, $\nabla_{\gamma}S$ ise

$$\nabla_{\gamma}S = (y^l \nabla_l S_{k\ldots j}^{i\ldots h}) \frac{\partial}{\partial y^i} \otimes \ldots \otimes \frac{\partial}{\partial y^h} \otimes dx^k \otimes \ldots \otimes dx^j$$

gibi verilir. Burada $\nabla_l S_{k\ldots j}^{i\ldots h}$ S tensör alanının kovaryant türevidir. O halde $X \in \Im_0^1(M_n)$, $\varphi \in \Im_1^1(M_n)$ vektör alanlarının $T(M_n)$ tanjant demette horizontal liftinin bileşenleri

$$\begin{cases} {}^{H}X = \begin{pmatrix} X^h \\ -\Gamma_i^h X^i \end{pmatrix} \\ {}^{H}\varphi = \begin{pmatrix} \varphi_i^h & 0 \\ -\Gamma_t^h \varphi_i^t + \Gamma_i^t \varphi_t^h & \varphi_i^h \end{pmatrix}, \Gamma_i^h = y^j \Gamma_{ji}^h \end{cases} \tag{11}$$

olarak yazılır.

$\overset{v}{R}, \overset{v}{\nabla}_X Y = \nabla_Y X + [X,Y]$, biçimindeki $\overset{v}{\nabla}$ konneksiyonunun eğrilik tensörü olmak üzere (lokal koordinatlarda $\overset{v}{\Gamma}{}_{ij}^{k} = \Gamma_{ji}^k$) aşağıdaki formüller yazılır:

$$\begin{aligned} [{}^{v}X,{}^{H}Y] &= {}^{v}[X,Y] - {}^{v}(\nabla_X Y) \\ [{}^{H}X,{}^{v}Y] &= {}^{v}[X,Y] + {}^{v}(\nabla_Y X) \\ [{}^{H}X,{}^{H}Y] &= {}^{H}[X,Y] - \gamma \overset{v}{R}(X,Y) \end{aligned} \tag{12}$$

$\varphi \in \Im_1^1(M_n)$, $X \in \Im_0^1(M_n)$ olmak üzere

$${}^{H}\varphi\,{}^{v}X = {}^{v}(\varphi X),\ {}^{H}\varphi\,{}^{H}X = {}^{H}(\varphi X) \tag{13}$$

olur.

1. Teorem $\widetilde{S}$ ve $\widetilde{T}$, $T(M_n)$, tanjant uzayında $(1,s)$ tipinde iki tensör alanı olsun. $\widetilde{X}_t$ $(t=1,...,s)$ ile ${}^{v}X$ veya ${}^{H}X$ vektör alanlarını işaret edelim. Eğer $\widetilde{X}_t$ alanları için

$$\widetilde{S}(\widetilde{X}_s,...,\widetilde{X}_1)=\widetilde{T}(\widetilde{X}_s,...,\widetilde{X}_1),\ \forall X\in\Im_0^1(M_n)$$

ise, bu taktirde $\widetilde{S}=\widetilde{T}$ olur ([4, s.101]).

M_n manifoldu üzerinde değişmeli almost cebirsel $\prod$- yapısı verilmiş olsun.

$\forall \underset{\alpha}{\varphi},\underset{\beta}{\varphi}\in\Pi,\ \forall X,Y\in\Im_0^1(M_n)$ için Nijenhuis-Shirokov tensörleri

$Q_{\underset{\alpha}{\varphi},\underset{\beta}{\varphi}}(X,Y)=\underset{\alpha\beta}{Q}(X,Y)$ olmak üzere

$$\underset{\alpha\beta}{Q}(X,Y)=[\underset{\beta}{\varphi}X,\underset{\alpha}{\varphi}Y]-\underset{\alpha}{\varphi}[\underset{\beta}{\varphi}X,Y]-\underset{\beta}{\varphi}[X,\underset{\alpha}{\varphi}Y]+C_{\alpha\beta}^{\gamma}\underset{\gamma}{\varphi}[X,Y] \qquad (14)$$

biçiminde yazılır.

${}^{H}\varphi\,{}^{H}\psi={}^{H}(\varphi\psi),\ \forall\varphi,\psi\in\Im_1^1(M_n)$ olduğunu biliyoruz [4,s.102]. Buna göre

$${}^{H}\underset{\alpha}{\varphi}\,{}^{H}\underset{\beta}{\varphi}={}^{H}(\underset{\alpha}{\varphi}\underset{\beta}{\varphi})={}^{H}(C_{\alpha\beta}^{\gamma}\underset{\gamma}{\varphi})=C_{\alpha\beta}^{\gamma}\,{}^{H}\underset{\gamma}{\varphi}$$

olur. Bu ise ${}^{H}\prod=\{{}^{H}\varphi\}$ yapısının da almost cebirsel yapı olması demektir.

${}^{H}\prod=\{{}^{H}\varphi\}$ yapıya göre $\underset{\alpha\beta}{Q}^{*}$ Nijenhuis-Shirokov tensörleri için, (9), (12), (13), (14) formülleri yardımıyla

$$\underset{\alpha\beta}{Q}^{*}({}^{v}X,{}^{v}Y)=0$$

$$\underset{\alpha\beta}{Q}^{*}({}^{v}X,{}^{H}Y)={}^{v}(\underset{\alpha\beta}{Q}(X,Y))-{}^{v}\{(\nabla_{\underset{\beta}{\varphi}X}\underset{\alpha}{\varphi})Y-\underset{\beta}{\varphi}(\nabla_X\underset{\alpha}{\varphi})Y\}$$

$$\underset{\alpha\beta}{Q}^{*}({}^{H}X,{}^{v}Y)={}^{v}(\underset{\alpha\beta}{Q}(X,Y))+{}^{v}\{(\nabla_{\underset{\alpha}{\varphi}Y}\underset{\beta}{\varphi})X-\underset{\alpha}{\varphi}(\nabla_Y\underset{\beta}{\varphi})X\}$$

$$\underset{\alpha\beta}{Q}^{*}({}^{H}X,{}^{H}Y)={}^{H}(\underset{\alpha\beta}{Q}(X,Y))-\gamma\overset{\vee}{R}(\underset{\beta}{\varphi}X,\underset{\alpha}{\varphi}Y)+{}^{H}\underset{\alpha}{\varphi}\gamma\overset{\vee}{R}(\underset{\beta}{\varphi}X,Y)$$

$$+{}^{H}\underset{\beta}{\varphi}\gamma\overset{\vee}{R}(X,\underset{\alpha}{\varphi}Y)-C_{\alpha\beta}^{\gamma}\,{}^{H}\underset{\gamma}{\varphi}\gamma\overset{\vee}{R}(X,Y)$$

bulunur.

1. Teoremi kullanarak aşağıdaki Teoremi ispatlamış oluruz:

2. Teorem M_n manifoldu üzerinde cebirsel $\prod$- yapısı verilmiş olsun. Eğer

$$\underset{\alpha\beta}{Q} = 0$$

$$(\nabla \underset{\alpha}{\varphi})(\varphi \underset{\beta}{X}, Y) - \varphi(\nabla \underset{\beta}{\varphi})(X, Y) = 0$$

$$(\nabla \underset{\beta}{\varphi})(\varphi \underset{\alpha}{Y}, X) - \varphi(\nabla \underset{\alpha}{\varphi})(Y, X) = 0$$

$$\overset{\vee}{R}(\varphi \underset{\beta}{X}, \varphi \underset{\alpha}{Y}) - \varphi \overset{\vee}{R}(\varphi X, Y) - \varphi \overset{\vee}{R}(X, \varphi Y) + C^{\gamma}_{\alpha\beta}\, \varphi \overset{\vee}{R}(X, Y) = 0$$

eşitlikleri sağlanıyorsa $\underset{\alpha\beta}{\hat{Q}^{*}} = 0$ olur.

Eğer almost cebirsel $\prod$-yapı almost integrallenebilirse, yani burulmasız ∇ konneksiyonu için $\nabla \varphi = 0$ oluyor ise bu durumda $\underset{\alpha\beta}{Q} = 0$ olur [3]. Diğer taraftan $\underset{\alpha\beta}{Q}(X, Y) = -\underset{\beta\alpha}{Q}(Y, X)$ olduğunu dikkate alırsak [5], bu tür yapılar için

$$0 = \underset{\alpha\beta}{Q}(X, Y) = -(\Phi_{\underset{\alpha}{\varphi}} \underset{\beta}{\varphi})(Y, X) = -\{(\nabla \underset{\beta}{\varphi})(\varphi \underset{\alpha}{Y}, X) - \varphi(\nabla \underset{\beta}{\varphi})(Y, X)\},$$

$$0 = \underset{\beta\alpha}{Q}(X, Y) = -(\Phi_{\underset{\beta}{\varphi}} \underset{\alpha}{\varphi})(X, Y) = -\{(\nabla \underset{\alpha}{\varphi})(\varphi \underset{\beta}{X}, Y) - \varphi(\nabla \underset{\alpha}{\varphi})(X, Y)\}$$

olduğundan dolayı 2. Teoremden aşağıdaki sonucu çıkartırız.

Sonuç: Eğer M_n manifoldu üzerinde almost integrallenebilen almost cebirsel $\prod$-yapı verilmiş

$$R(\varphi \underset{\beta}{X}, \varphi \underset{\alpha}{Y}) - \varphi \underset{\alpha}{R}(\varphi \underset{\beta}{X}, Y) - \varphi \underset{\beta}{R}(X, \varphi \underset{\alpha}{Y}) + C^{\gamma}_{\alpha\beta}\, \varphi \underset{\gamma}{R}(X, Y) = 0$$

şartı sağlanıyorsa, bu taktirde $\underset{\alpha\beta}{Q^{*}} = 0$ olur. Burada, R, ∇ konneksiyonunun eğrilik tensörüdür.

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CHALLENGES TO THE EUROPEAN ADMINISTRATIVE ELITE IN THE NEW MILLENNIUM

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ABSTRACT: At the dawn of the new millenium, the European continent faces some of its greatest challenges in decades, from the economic to the social and political. The task of addressing and meeting these challenges falls mostly on the shoulders of Europe's administrative elite - those who have the educational, technical and legal capabilities to solve the problematic issues facing Europe today. This study examines the role of administrative elites in European government and society, and the identification of several challenges that can be addressed by these same elites.

Key words: *Administrative Elites, Europe, Minorities, Nationalism, Political Integration*

ÖZET: Yeni binyılın başlangıcında, Avrupa kıtası ekonomiden, sosyal ve politik alana dek onyıllardan beri karşılaştığı en büyük zorluklarından bazılarıyla yüz yüze gelmiştir. Bu zorlukları tespit etmek ve çözmek, Avrupa'nın karşı karşıya olduğu bu sorunlu konuların üstesinden gelebilecek eğitim, teknik bilgi ve yasal yetkilere sahip olan Avrupa idari elit kadrolarına düşmekte. Bu çalışma, Avrupa hükümet ve toplumunda, idari elitin rolünü incelemekte ve aynı elit tarafından ele alınacak bazı zorlukların tanımını yapmaktadır.

Anahtar sözcükler: *İdari elit, Avrupa, Azınlıklar, Milliyetçilik, Siyasi Birleşme*

Among the people of Europe, a deepening sense of crisis has been found at the beginning of the 21st Century as ethnic and religious tensions mount, as unemployment rises and economies stagnate, as mass movements of people increase, and as threats of terrorism and violence escalate. Since the fall of the Berlin Wall and the collapse of the Soviet Empire, Europe has experienced political, social and economic upheaval, focused mostly in Central and Eastern Europe, but nonetheless felt throughout Western Europe as well. The unification of Germany, the separation of the Czech and Slovak Republics, the continued Balkan instability, the on-again-off-again efforts at further integration of the European Union, and a stagnating European economy all acted as indicators in the 1990s of the enormous sea change that had engulfed Europe. The relative stability experienced by Europe after the Second World War, a result of Cold War politics and a rapidly expanding European economy, no longer existed as Europe looked to the new millennium.

While most Europeans are aware of the crises that threaten to disrupt their lives, they as individuals shoulder little responsibility, outside of electoral prerogatives, in finding solutions to the impending predicaments. Those to whom the daunting task of managing the woes of Europe falls upon are the administrative elites within the European states and European-wide governmental organizations. Although it is true that in the world today the influence of business and nongovernmental organizations has increased, governmental institutions within the context of the "nation-state" remain the primary form in managing state relations and the main force in policy initiation and utilization. Central to European governments are the administrative institutions established by individual states' constitutional requirements or by patterns of behavior acted out over time (e.g., British common law). European-wide institutions maintain a secondary, but steadily increasing, role in decision-making processes. Within this framework of European institutionalism work the administrative elites. Administrative elites are those, according to John A. Armstrong, who direct the administrative institutions, the individuals ultimately responsible for policy formation and implementation (Armstrong, 1973, p.3).

Defining Administrative Elites

As described by Armstrong, defining administrative elites, or even elites in general, can be a somewhat difficult task. How do you identify those individuals in positions of authority that could be considered "elite?" How do administrative elites differ from organizational and bureaucratic elites, if they differ at all? How can you separate bureaucracy from administration? Kenneth Farmer states that elites are those who possess "some characteristic highly valued by the community." (Farmer, 1992:1). In general, the issue of elite definition depends primarily upon the institutional perspective of social and governmental structures.

A structural approach assumes that the political and social institutions of a society play a predominant role in determining the development of societal goals, while the free will of humans is comparatively irrelevant (Farmer, 1992:7). Structuralists thus focus on the office rather than the individual holding the office. For structuralists, an

individual holding a particular position within the institutional hierarchy of a state becomes a member of the elite, regardless of his contributions to policy formation. While this may be somewhat deterministic, it is important to remember that human volition is not denied, rather it is subordinated to the institutional structures. A functionalist approach, on the other hand, sees the role played by the individual holding office as the defining factor in a society. State and social structures exist but it is the actors within these structures who guide the development of state doctrine[1]. Accordingly, individuals within institutional structures who contribute to the formation of state and social policy are identified as members of the elite.

The position of elite identification taken by this study is, broadly, a combination of both the structural and functional approaches, reflecting the implicit views taken in several analyses of administrative and bureaucratic elites. In these analyses can be found the combined characteristics of both structural and functional approaches, although the position cannot be classified as the archetypal structural-functionalist approach[2]. While granting that an office within the administrative structure can be institutionally influential independent of the individual holding that position, this study assumes that such an individual in a position of administrative authority would not have achieved this office without the proper personal qualifications.

Outside of broad theoretical statements, a more explicit understanding is required if the nature of the role of administrative elites in addressing challenges to Europe and the European states is to be understood. According to Armstrong, a popular distinction between elites is made as part of a disciplinary bias. Political scientists, in general, prefer the use of "administration" to refer to the "formally nonpolitical activities of government," while sociologists look at the same phenomena as "bureaucratic." (Armstrong,1973:6). For Farmer, one method of identifying administrative elites are those who possess "power," which is defined as the relative freedom from structural constraint (Farmer, 1992:7). Other definitions include those appointed to high public office or those born to fill administrative roles. Despite a seeming lack of consensus with in the field of political science, a definition of administrative elites can be culled from scholarly writings. In essence, what distinguishes administrative elites from other types of elites such as bureaucratic and political elites is determined by the combination of a number of characteristics, including education, socialization, family history, recruitment, elite-society relations, and role definition within the institutional framework of any given state and society.[3]

Beginning with education, in any number of European states, most of those who fill administrative elite positions within the governing institutions have had access to higher or special educational facilities, primarily in the form of universities, colleges, or special training schools (Aberbach, 1981:47). Rank and privilege in most states of Europe is partially determined even today by educational background, and this value is reflected by administrative elites and the institutions they lead. In the formerly socialist states of Europe, the educational system prior to the collapse of communism was more stringent, in effect indoctrinating and grooming the future

administrative elites. As an example, before the disintegration of the Soviet Union, most individuals preparing for administrative posts within Soviet government attended some higher institution prior to joining administrative offices. In such a system as the Soviet state established it was understood that to rise in the ranks of privileged administrators, one needed also to attend special party schools for Marxist-Leninist indoctrination, in addition to schools of higher education (Farmer, 1992:54, 58-61).

After the collapse of the Soviet bloc, this party education and indoctrination of course ended. However, articles and exposés in the public media have indicated that eastern Europeans are now joining their western counterparts and applying a time-honored strategy in educating and employing their elites. For centuries, the primary method of obtaining first, an appropriate education, and second, an appropriate occupation was through family ties. Historically, sons and nephews of well-placed individuals found access to the halls of the proper educational institutions through their family connections. Later, these connections led to desirable jobs in positions of authority. A classic example is Alexis de Tocqueville, a son of a minor aristocrat, who was able to parlay his education and social status into a moderately famous tour of the United States and a position as a magistrate (Tocqueville, 1981:xx-xxiv). While Tocqueville's case is somewhat dated, it nonetheless demonstrates, historically, the role of family in obtaining high administrative positions. Even today it is acknowledged that influence-peddling, particularly of the familial variety, provides rare opportunities for advancement in education and in professional fields.

According to Armstrong, however, the variety of familial influence, education, and socialization within a European context is different than that found in the United States. European family connections are much closer on an intergenerational level, but remain more professional and businesslike than the American counterpart. The goal of placing a son or daughter in a high administrative post is to further the interests and historical prestige of the family, not a concern for the child's individual welfare. As noted by Armstrong, in Great Britain, "upper-class parents and children have been on visiting terms since Tudor days, with servants acting as foster parents," and boarding school becoming a surrogate home after early education (Armstrong, 1973: 97, 105-107). This similar phenomenon is found in a number of other European states as well. School and schooling consequently becomes an important factor in the training and socialization of administrative elites. Combined with familial ties and family history, the path to the heights of administrative institutions becomes more navigable.

Yet the process for achieving administrative elite status is not ended with the proper education, family history, and socialization. Also important is the recruitment process, elite-society relations, and role definition, the more theoretical aspects of establishing elite authority. After suitable schooling and childhood socialization, it is still possible for a number of young Europeans to fail in achieving administrative posts. This is due mostly to recruitment systems of various institutional structures.

The primary method in the recruitment of European administrative elites is ascriptive in nature, in effect utilizing upper-class children, and particularly boys, as the main source of recruits (Armstrong, 1973:73). This holds true for most European states, with the notable exception of the former Soviet Union. Seventy years of communist rule lead to an administrative elite that, by the early 1970s, was characterized as primarily peasant, with a strong working class presence (Armstrong, 1973:74). Only a decade since the collapse of the Soviet regime, we can see the Russian Federation adapting itself to the realities of West European government, as technically and educationally sophisticated individuals take places within the hierarchy of Russian government (Savvateyeva, 1994:8-9). Certainly it is the case that in a number of former Soviet satellite states, members of social, cultural, or economic elites have obtained high positions in government organizations.

In the modern world, the organization of state and society has become technical and functional in nature (see notation[5]). The organizational structure of a state and social unit "develops some division of labor, assigning responsibility for coordination to a small group." (Putnam, 1976:135). This leadership group (i.e., elite group) inadvertently begins to develop special skills and contacts, and begins to monopolize the control of information, thus acquiring power over other groups. To perpetuate its leading role, the elite group must transform this "coercive" power into willing obedience by the masses. It does so by developing and disseminating state and social doctrines that are accepted by the society (Armstrong, 1973:48, Putnam, 1976:136). While this is an endeavor that is made by all elites, administrative elites are particularly influential in the dispersion of what Armstrong labels "development doctrines," due to their ability to influence the technical aspects of government policy (Armstrong, 1973:47). With care, the distribution of the proper development doctrine ensures a relationship between the administrative elites and the masses that protects the role of the elite administrators within the state and social system. In addition, a favorable development doctrine (e.g. one that is not rejected by society) leads to a passive role definition, indicating that the elite administrator understands his role as non-interventionist (Armstrong, 1973:19, 49). Whereas an active role definition might foster resentment in the public for perceived nondemocratic control, a perception of passive involvement leads to further acceptance by the masses and increased recruitment capabilities.

Introducing an acceptable development doctrine into a society creates the framework for establishing an administrative elite. Following up the dispersion of the doctrine with appropriate role definition and the necessary recruitment process further reinforces the leading role of administrative elites within a state structure. Through a process of socialization, education, and familial influence a "class" of citizen emerges with the ability and the authority to make administrative judgments and policy choices, and address challenges to the state. Yet, how are challenges to the state identified and defined? The following sections attempt to answer this question.

Identifying Challenges To Administrative Elites

In the early 1990s, at a meeting held to prepare a world summit, participants were asked to "brainstorm" and create a list of possible "shocks," or unexpected crises and events, that would be likely to occur within the following ten years. The participants' responses to the brainstorming session highlight one of the significant problems for administrative elites and others in positions of authority. Of the crises listed, only two of twenty had any overlap in support between participating states (Jacquemin and Wright, 1993:5). This demonstrates that although there exists numerous problems and crises needing resolution, there is often little agreement as to what are the important issues and what the priorities of European-wide institutions should be. Individual and group elites representing different administrative institutions will naturally have different priorities and agendas. Thus what is of important immediate concern for one elite cadre may be completely irrelevant to others.

In addition to having difficulty in identifying salient challenges, there exists the possibility that some of these crises cannot be easily solved, if at all, by administrative elites. To a certain extent, the role of administrative elites, while influencing cultural patterns, is normally understood within the context of governmental/political, economic, and to a lesser extent, social functions. Of the many problems that confront Europe as it passes the turn of the century, there are those that fall outside the direct purview of administrative elites. Such a potential problem as an extreme cultural and/or social trauma might induce, be it the growth of religious sentiment, the rise of alternative social movements or other phenomena, is not necessarily the direct responsibility of the administrative elites, nor should they necessarily be able to address such concerns. This is not to submit that the work of administrative elites has no value outside traditional governmental concerns, nor that their work does not influence and is influenced by society and culture. As both Armstrong and Farmer indicate, educational and social experience instill within administrative elites a role perception that "represents learned responses to social stimuli." (Armstrong, 1973:7). However, in the end, administrative elites are limited by the resources available to them, their own training and education, and the mandates of their positions. Administrative elites function within a governmental institutional structure where their responsibilities include guiding the formation and implementation of policy necessary for the state to function, not single-handedly solving the ills of a society.

For the benefit of limiting the focus of this study, a methodology has been selected that will distinguish European challenges that can be addressed by administrative elites from challenges and crises that are not directly related to administrative elites' roles or positions. In his work, The European Administrative Elite, Armstrong conducted an "exploratory study" of administrative elites in four European states. In addressing challenges that administrative elites faced and how they responded to crises, Armstrong created a framework for the identification of such challenges, one that would determine the saliency of these crises by the possession of four characteristics. First, each challenge must have been a problem of great magnitude

for all four states in the study. Second, the allocation and mobilization of resources should have been salient. Third, there must have been a strong potential for administrative intervention in solving the challenge. Finally, the "inherent physical properties of the challenge or its locus in time must [have been] sharply delimited." Armstrong, for the benefit of his specific study, added an additional practical element, that the challenge must have been sufficiently discussed (Armstrong, 1973:275). Since Armstrong chose to focus his study on the special relationship between administrative elite mobilization and economic development, there were limited challenges that met his methodological requirements (Armstrong, 1973:4).

This study will take a broader scope to include social and political challenges as well as economic crises, while still attempting to limit the search for challenges that meet Armstrong's methodological standards. Increasing search parameters does not conflict with any of Armstrong's four criteria. More than twenty years after his classic work, world dynamics are significantly different than those of the late 1960s and early 1970s. The growth in communications and other technologies, the increased capability to travel, and the rise in multinational corporations conducting transnational business has brought political, social, and economic events in separate parts of the world into close proximity. War in the Balkans had a profound effect outside of the Balkan Peninsula. Repercussions from the unification of Germany and the collapse of the Soviet Empire are felt around the world still today, a decade after they happened.

In one sense, economics plays a central role in much of what occurs, as the German reunification example demonstrates. In addition to the political and social aspects of reunification, economically that act created the largest single market within Europe and virtually guaranteed Germany's leadership role in the European Union. What remains of Armstrong's framework is to determine the potential for administrative action and participation. Naturally, a broader base such as described will, of necessity, sacrifice some of the detailed analysis of Armstrong's study. However, the goal of this current research is to examine the challenges faced by administrative elites in the new millenium and beyond, not to reexamine a definitive work on the subject of administrative elites and their economic influences.

The salience and relevance of Armstrong's framework to this study becomes obvious when utilizing his methodology and applying it to the Europe of the new millennium. The number of crises and challenges that must be faced by administrative elites in each of the individual European states and within European-wide institutions become clearly delimited and well defined. A brief survey of the condition of Europe today reveals that significant challenges faces individual state administrative elites and that many of these crises are shared among a number of the European states. Reviewing scholarly literature, reading world news reports, watching international news programs, and examining governmental activities all provide good indicators as to what issues and problems concern the governments and peoples of Europe. Briefly, those that are found to be most universal in nature include the rise of nationalist fervor and the related growth of ethnic violence,

minority rights, migration, and the increasing integration of political, economic, and social institutions. The next section examines each of these issues to determine how well they fit into Armstrong's methodological framework.

Defining Challenges to Administrative Elites

Nationalism and Ethnic V iolence

Several of the most immediate crises facing a number of European states are closely related and include the problems of resurgent nationalism and corresponding ethnic violence. A prime indicator of the severe nature of these several problems is the series of conflicts in the former Yugoslavia that occupied much time in the 1990s. While the Yugoslav conflicts can be identified as crisis points for European states and Europe as a whole, do the issues they represented provide a genuine challenge to the European administrative elites based on Armstrong's methodological framework? Certainly nationalist tension is an important issue in any of the increasingly diverse European societies. In the Europe of the 1990s nationalism and minority rights became flashpoints of crises from Northern Ireland to Spain, Germany, and throughout central and Eastern Europe. One primary cause in the rise of nationalist and ethnic tension, and bringing the "problems of minorities in Europe into sharp prominence" was the collapse of communism throughout Eastern Europe (Hobswawn, 1990:163). With communism no longer a binding force on the peoples of Eastern Europe, newly elected "democratic" governments relied on appeals to the national majorities within their societies to help them consolidate state authority.

For most of the former Soviet satellite states of eastern and central Europe, the purpose of their governments has been to serve the needs of the new nations and their citizens, primarily identified as the dominant majority (Pajic, 1994:65). This focus aggravates the problem of minority rights by ignoring the minority constituents. In doing so, the new governments of eastern Europe subsume the rights of the minorities to those of the majority, a potentially dangerous situation that could lead to the growth of resentment by national minorities and foment nationalist, ethnic, and minority violence. The cases of Bosnia-Herezegovina and Kosovo were extreme example of this, with ethnic cleansing a fact of life, sponsored by a rump state that had collapsed around its nationalist constituency. Yet in the East, Yugoslavia has not been the only example of rising nationalist tension. In western Romania and the Slovak Republic, ethnic Hungarians experience discrimination and other minority abuses on a daily basis, from the outlawing of their national tongue to the confiscation of property. Turkish minorities in most Balkan and central European states face housing, linguistic, and employment discrimination. East European and Balkan gypsies encounter much the same discrimination as the Turks, with children required to study in the majority language and constant attacks on their unique culture a grim reality. Albanians are not left out when confronted with hostility and violence in a number of former Yugoslav republics, Kosovo being only the most recent example (Gurr, 1993:181, 196, 205, 328t).

Western Europe also has not been able to escape the increasingly fractious nationalist elements that afflict the central and eastern sectors of the continent. The historically singular "nation-states" founded in the aftermath of the American and French Revolutions over time developed legal-institutional structures that reflected the cultural dominance of the majority nationality within each state. This has led to a so-called "crisis of national consciousness," with minority groups questioning the cultural, legal, and institutional dominance of the majority nationality (Hobsbawm, 1990: 18-20, 22, 188). Older minority groups that have been living in relative calm within the existing institutional structures have been experiencing cultural reawakening and are reevaluating their roles in the current state and social structures. While to date protest is favored over open rebellion, the demands of such nationalist minority groups as the Bretons, Frisians, Galicians, Basques, and Irish are steadily mounting as discriminatory practices become too burdensome to continue accepting (Gurr, 1993: 139, 141).

The scope of the crisis of nationalism and minority rights certainly appears to fit Armstrong's criteria of the widespread nature of a challenge to administrative elites, with nationalist issues being raised from the farthest reaches of eastern Europe to the islands west of the continent. However, do the issues of nationalism, minority rights, and ethnic violence also hold true for Armstrong's other criteria? The above discussion reveals the nationalism question to fit at least one of Armstrong's other standards, that of the challenge having the physical properties or locus in time that is sharply delimited. In the East, its is not difficult to demonstrate that the collapse of communism acted as the catalyst for nationalist fervor, dating the rise of renewed nationalism to a specific period of time, 1989-1991. The return to nationalist ideology as a method of consolidating state power by very nearly all of the former communist states thus has placed the nationalist issue at a specific locus in time, while at the same time the physical properties of the challenge (ethnic violence, nationalist discrimination) become obvious and delimited.

The nationalist question in the West became a significant concern at roughly the same moment in time. It can be argued that although there exists a long history of struggle among some ethnic and nationalist groups such as the Basques of Spain and the Irish of Northern Ireland, the locus in time for the rise of nationalist tension is also limited to the later half of the 1980s and the early part of the 1990s. While it has been asserted by some scholars that the time to study a problem is when "the problems that are actual in the world today first take visible shape," the events of the last ten years have created a contemporary locus in time for the rise of nationalism in Western Europe (Barraclough, 1967: 20). Prior to the 1980s nationalist movements were primarily attempts at retaining cultural identification within a state that contained an overwhelming majority nationality. With the collapse of communism, the reunification of Germany, erratic economic prospects, and growing fears of migration, many nationalist groups passively residing in Western Europe have now, at the beginning of the new millennium, moved to reclaim what they believe is theirs by history and by legal right (Hobsbawm, 1994: 10). Reports of Welsh towns being renamed in the

Welsh language, the South Tyrolians and Bretons reaffirming cultural and territorial history, and the increased use of Catalan as a means of communication all indicate that previously acquiescent minority groups are becoming more visible in the defense of their traditional culture.

The potential for administrative elite involvement in these issue areas, another of Armstrong's four characteristics, is quite high in bringing resolutions to the challenges of nationalism and ethnic violence. The manifestation of most ethnic and nationalist demands appears primarily in the form of calls for independence or increased autonomy from the institutional structures of a state. While these types of demands are political in nature, they are not explicitly so, due to the policy oriented character of such demands and the role played by both political and administrative elites in the policy process (Aberbrach, 1981:85). Politicians, according to Aberbach, serve a broadbased constituency with ill-defined focus on matters of policy. They can make general assessments, agreements, or even concessions, but their actions lack the necessarily solid legal and institutional foundation. Administrators, on the other hand, serve a much narrow constituent base, their role being sharply defined. They are the technical experts who develop the policy foundations of political actions (Aberbrach, 1981: 90).

A decision to grant nationalist demands such as political autonomy does naturally have to be made by the political elite of a state, as often they are the nominally constitutional leaders. Yet it remains up to the administrative elites' to see that the new policy directives are implemented and fulfilled. Administrative elites' technical focus affects policy decisions in that the viability of political resolutions remains dependent on the ability of administrative elites to execute policy prescriptions. If the implementation of a policy proposal is untenable, the political decision is influenced. To simply grant a national minority autonomous or independent status may be a reasonable solution to a potentially explosive situation, yet to grant autonomy or independence requires far more than simply agreeing to the alteration of the current institutional arrangements. One of the more recent referendums on Quebec's independence from Canada, while not exactly European in nature, demonstrates the political nature of a nationalist question. Fearing the demise of their cultural and national heritage, French-speaking Canadians in the province of Quebec held the referendum in order to separate themselves from Canada. While this would be an enormous political situation, it is not one of immediate impact. According to a New York Times article, if the vote had favored independence, it would have been years before there was any real move to absolute independence (Farnesworth, 1995:3). The process of establishing independence requires significant policy changes which must be guided by administrative elites and certainly cannot be completed in a short amount of time. In the same manner, other nationalist demands with policy implications, be it conducting business and education in a national language, observing nationalist holidays, or extending the limits of sovereignty, necessarily requires the involvement of the administrative elite.

Of Armstrong's four criteria, his idea that allocation and mobilization of resources be salient is deceivingly simple. It can be argued that nationalist issues raised in each

state of Europe require the utilization of resources in solving the problem, but this does not necessarily make the use of resources salient to the challenge. To a certain extent, the use of financial, social, or political resources is a part of the daily life and routine of any governmental administrator. What is important for a challenge in meeting Armstrong's requirement is that the allocation and mobilization of resources be case specific. In the instance of resurgent nationalism and escalating ethnic violence, it can be argued that resources used to combat this challenge are salient to the crisis.

A number of states in Europe, particularly in the West, have set aside financial resources to address nationalist concerns. A case in point, educating children of national minorities in their native language is certainly not cost effective for a state with a large dominant majority. Yet this is exactly what is occurring across Europe as administrators attempt to stem the tide of rising nationalism. Another example is the increasing funding and use of inter-European organizations whose purpose it is to settle matters of conflict within and among the states of Europe. The Council of Europe has recently come into prominence as a tool for addressing nationalist concerns, as has the Organization on Security and Cooperation in Europe (OSCE) (Schumann, 1990:99). These and other organizations have utilized resources in recent years for the specific purpose of solving nationalist issues, be it the numerous conflicts in the former Yugoslavia or the education of ethnic Turks in Germany. Ultimately, while funding for the resolution of nationalist concerns is a constant, the increased saliency of nationalist issues will entail a corresponding increase in the allocation and mobilization of resources to address such considerations.

Minority Rights

As noted above, the issue of minority rights has been brought to prominence by the events of 1989-1991, particularly in Eastern Europe. Much of what has been said about nationalism holds true for the challenge of minority issues. From the desire to learn in a minority language to calls for autonomy in regions predominantly inhabited by minority nationalities, it is often hard to separate minority issues from nationalist issues. Efforts to rejuvenate historical or cultural ties are often ethnic in nature, focusing on shared language, common history, or kinship ties, and later developed into nationalists issues, such as the quest for self-government. The purpose of this section is to note the possible existence of cases where nationalism and minorities are separated from one another and to examine if such a case could fit into Armstrong's crisis framework.

As has been stated, separating minority issues from nationalist questions is not an easy task. Yet it is not entirely impossible, for the simple reason that minority questions are not restricted to nationalist characteristics, nor are all nationalist issues related to minority rights. One manifestation of nationalism that has not been examined in this study is that of majoritarian nationalism. In many states of Europe there is a corresponding rise of majoritarian nationalism, in response to increased minority nationalist activity. Unfortunately, the cases of majority nationalist

expression are often tainted by increased and active discrimination rather than reaffirmation of "self-national" pride. The type of activities referred to are manifest primarily as anti-Semitic or anti-minority demonstrations, which have historical precedents dating to the late 19th century (Hobsbawm, 1990:105, 166-174). German extremists firebombing Turkish workers' hotels and ethnic dance clubs, former Soviet republics disenfranchising ethnic Russians, and the multiple ethnic conflicts in the Balkans are all grim reminders that majorities have not always treated fairly nationalist minorities.

It is well documented that minorities have often suffered at the hands of majoritarian regimes, some for several hundreds of years. Political marginalization and economic discrimination, nominally caused by systematic exclusion from access points in the political or economic arenas of a society, have prevented minority groups from fulfilling social and cultural goals (Gurr, 1993:42-43, 46-48). However, these practices are not based solely on responses to ethnicity and nationality. Two groups that are well ensconced within minority issues have little to do with questions of nationality. They are, respectively, racial minorities and religious minorities. Of these two groups the former does not appear to have become involved in issues of crises proportion, such as those examined in this study. While Europe remains predominately white, it is increasingly becoming "darker" as migration increases from Turkey, the Middle East, and former colonial holdings in the Third World. Using Armstrong's theoretical framework, the question of race does not appear to be a challenge needing the attention of administrative elites. Race questions are not a problem of great magnitude for any of the states of Europe (see notation [4]), nor has there been salient allocation and mobilization of resources. While there is strong potential for administrative elite intervention, current research does not indicate that there has been an extensive elite mobilization to address issues of race, which has often been associated with national, ethnic, or immigration issues. Finally, the "inherent physical properties" of race or its locus in time have not manifested themselves. A primary cause for the failure of such a manifestation is that many of those who come to Europe are not so much defined racially as they are ethnically or nationally. Thus questions of race are subsumed to issues of nationalism.[5]

Religious minorities, however, are more problematic when their case is applied to Armstrong's crisis framework. Europe has historically been Christian (Catholic and Protestant) with only marginal inroads made by non-Christian peoples during the height of the Ottoman Empire and the North African occupation of the Iberian peninsula. Many of those who currently migrate to Europe in search of a better life are less often Christian and predominately Muslim, joining an increasingly active Islamic minority in a number of European states. Accompanying the increase in Islamic migration and activism is an increase in Muslim fundamentalism and terrorism (Gurr, 1993: 21, 116). The enlarged Islamic presence in Europe does certainly seem to be a challenge of great magnitude. A core component of the early 1990s crisis in Bosnia was religious, with Christian Serbs intent upon eradicating the Bosnian Muslim presence in the Balkans. For its involvement in North Africa, France has suffered numerous terrorist attacks, most claimed or attributed to

fundamentalist Islamic terrorist organizations. Even the Dutch, who are historically famous for their religious tolerance, have had difficulty with the Islamic question, as mosques and Muslim community centers are subject to defacement and vandalism. In some cases, the issue is primarily one of nationalism, as with Turkish workers in Germany. However, Arabs, North and Central Africans, Central Asians, and Pakistanis are also migrating to Europe and they too share the common thread of Islam.

The locus in time or physical properties of the Islamic question are delimited by the increased violence of and against Muslims in Europe in the 1980s and 1990s, meeting a second of Armstrong's requirements. Prior to the 1980s, violent actions taken against Muslim minorities were predominantly nationalist in nature, focusing on the country of origin rather than the religion. For the last ten years, however, the growing Islamic presence in Europe, and the increasing Islamic militantism in former colonial holdings have made many Europeans fearful of a Muslim influence in their states and societies. Some attribute the cause of conflict to be the philosophy that Muslims bring with them (which is found to be inherently incompatible with Western values), rather than the increasing numbers of Muslims who come to Europe (Gurr, 1993:250). Others claim that it is not the religion per se, but the cultural values of the countries of origin or the tendency of Islam to vest state authority on religion and nationality, again tying the issue to nationalism (Robinson, 1994: 215-216).

For whatever reason, the growing presence of Islam in European societies has become a challenge at the beginning of the new millennium. Is this a challenge that can be addressed by administrative elite, again another of Armstrong's requirements? By most appearances, the issue of a growing Islamic presence in Europe can be addressed by elite administrators. One important aspect of administrative elite authority is developing and distributing state and social doctrine (as discussed in the first section). Administrative elites have it within their ability to create, over time, a social "philosophy" through policy prescription that allows for the acceptance of Islam within European society. By altering the development doctrine of a society, elite administrators can bring about public acceptance of Islam and Muslims to a society, providing of course that social values allow for this type of adjustment. While this is not a short-term endeavor, the steps can be taken now to lay the foundations for future doctrinal adjustment.

A further possibility of elite involvement in solving the Islamic question also relates to the salient allocation and mobilization of resources, the last of Armstrong's requirements. Important to any migrant group is integration into a society. For Muslim immigrants to Europe, this has been a less than successful undertaking. For administrative elites, it is necessary to create policies that will assist Muslims in integrating into their new societies (Miller, 1995). These policies do, of course, take time and money to initiate, develop, and implement. In addition to adjusting native perspectives on the influx of Muslims, it is also necessary to educate the Muslim immigrants as to the culture and traditions of their new home, to educate them in

order to become productive members of their society, and to help them adapt to their new lives. Education might have to initially be bilingual, until recent immigrants can grasp the new language. Special dispensation may be needed for housing, religious questions, or any number of other social factors. Finally, many new Muslim immigrants face open and public hostility, at times requiring special police protection. Almost any extraordinary action taken by elite administrators to facilitate the integration of Islamic migrants into a culture will have inherent costs, and due to the growing presence of Islam in Europe, many of these costs are found to be salient allocations of available resources in determining the nature, and addressing the issues, of the Islamic challenge.

Migration

Migration is another issue, such as nationalism or minority rights, that has a long history where Europe is concerned. Traditionally a source of emigration, Europe has, in the last twenty-five years become a major source of immigration as migration patterns have changed globally (Castles and Miller, 1998:65, 78, 81, Purcell, 1993:216). Governments across Europe have a vested interest in migration issues and many are taking moves to address migration problems. Even some non-traditional governments are becoming involved in the debate, as even Papal speeches have demonstrated (Bohlen, 1995:7). Yet, is there enough of a concern about the nature of migration in the Europe of the 2000 to constitute a challenge to the administrative elite? In terms of magnitude, migration is an issue that has international implications for much of Europe. Many states of Western Europe have become receiving countries for much of the worlds immigrant population. Immigrants from former colonial holdings, lesser developed countries, and the former communist bloc all look to Western Europe for their futures. In addition to the favored Northern and Western European states, countries such as Italy, Greece, and Spain have also attracted a large immigration movement, particularly from Asia and Africa (Castles and Miller, 1998: 80t, 81). Even former Soviet satellite states, such as the Czech Republic and Hungary, have become destinations for those seeking new lives for themselves and their families. In a study conducted in the early 1990s to determine shaping factors for Europe in that decade and beyond, seven of twelve thinktanks participating in the study stated that migration issues were significant economic, social, and political concerns for the future (Jaquemin and Wright, 1993:236, 289, 295, 322-323, 363, 390). Tellingly the French group noted that France was reticent in acknowledging any immigration concerns, focusing instead on the "uniqueness" of the French cultural tradition and the search for French identity, an interesting avoidance of an obvious concern (Jaquemin and Wright, 1993:206-208). For the span of time given, it is remarkable that even today, the same concerns exist.

Whether acknowledged or not, the issue of migration does appear to be of significant magnitude to qualify it for an authentic European challenge. However, this does not necessarily make it a salient issue with regards to the nature of the challenge. Armstrong's requirement was that the challenge must have "inherent

physical properties" or a "locus in time" that is sharply delimited. Do the immigration concerns of Europe today have delimited properties or are they rather part of the ongoing development of migration, continuously shaped by changing historical factors? It can be argued that the migration problems of today are well defined and salient for this period of time. While migration is continuous and historical in nature, a number of developments have established migration as a salient challenge. One of the most significant factors has been the collapse of the Soviet bloc (Kussbach, 1992:646). As with nationalist and ethnic issues, the demise of the Soviet Union opened the floodgates of the migration issue. While some expected the flow of people from Eastern Europe to come to an end, the opposite proved true. The reasons for leaving the former Soviet and Soviet satellite states are manifold, primary among them economic instability, social unrest, armed conflict, resurgent nationalism, and political unease (Kussbach, 1992: 647-650). All of these problems are not new to the issue of migration. However, the suddenness of their development can be tied directly to the collapse of the Eastern bloc, creating, at least from the East European perspective, a specific locus in time and inherent physical properties that are salient for European administrative elites.

Outside of East-West issues the migration question is not so clearly delimited. Economic productivity, aging populations, and low birthrates in industrialised Western Europe, some of the traditional sources of the need for immigrant populations (as a disposable workforce), have become less viable factors with regards to the migration issue. While older populations and lower birthrates still afflict European states, they have, to a certain extent, been countered by industrial modernization, slow economic growth, and previous migrations. The times when hundreds of thousands of "gastarbeiter" were needed and allowed into Germany have been replaced by a period of economic uncertainty and rising hostility towards foreign workers. Still, evaluation of global migratory movements since 1973 clearly demonstrate that Europe remains a preeminent destination for those seeking a new life in a foreign country (Castles and Miller, 1998:6m).

In the past fifteen years or so, the type of immigration has also changed. Historically, migration of single adults into Europe for economic and labor reasons was the norm. Since the 1980s the focus has shifted to "finding the right balance between worker and family migrations," as well as the prevention of illegal migration. In most Western European states today, the basis for legal immigration falls under family reunification criteria (Castles and Miller, 1998:88-89). This has a significant effect on immigration patterns to Europe in that not only are non-working relatives allowed in, but relatives capable of holding work as well.

In terms of the ability of administrative elites to address the migration challenge, the question is nearly moot. Administrative elites, as the guardians of state policy, are almost solely responsible for the technical application of policy. While there are the necessary and obvious political concerns over migration issues, the burden of solving the migration challenges lies almost exclusively with elite administrators. They are responsible for formulating and implementing migration policies,

determining the parameters for legal entry into a state, and developing strategies for the prevention of illegal immigration. James Purcell sees the current migration dilemma in Europe, and around the world, as reflecting "the absence of...policy measures or mechanisms to address migration pressures," which falls under the mandate of elite administrators in a state and European-wide context (Purcell, 1993:217-218). While individual states may develop migration controls, in the Europe of the 21st Century, a more integrated European system, with open internal borders and the free flow of goods, services, and workers, necessitates the creation of a pan-European migration program and strategy, further attesting to both the scope of the migration challenge and the necessary involvement of administrative elites (Castles and Miller, 1998:269-270). The real challenge to administrative elites in solving the migration dilemma is to develop policy approaches that are equitable to all parties involved, including sending and receiving states, but most importantly to the immigrants and their families.

Identifying the allocation and mobilization of resources as a salient component of the migration dilemma proves to be somewhat difficult for the simple fact that most of the allocation of resources towards migratory control is a continuous activity. Monitoring borders for illegal entry, verifying citizenship or status for work-related concerns, or updating and reviewing citizenship and immigration policies are historic enterprises on the part of state bureaucratic and administrative structures. Proving unequivocally that the allocation of resources in the 1990s was any different than that of previous decades would take a great deal of fiscal investigation to verify. However, a simpler approach may suffice. In many instances, the allocation and mobilization of resources occurs as administrative elites implement policies designed to solve problems of great magnitude. Therefore, it would not be unreasonable to conjecture that the increasing awareness of the migration dilemma by administrative elites, and their attempts to solve this problem, is accompanied by an increased mobilization of resources for the implementation of migratory control policies. Repatriation, intensified verification, updating legalization procedures, and increased border monitoring all include the increased use of fiscal, social, and political resources.

Political, Social, and Economic Integration

In terms of Armstrong's methodology, the issue of whether or not the political, social, and economic integration of Europe represents a challenge to the administrative elite could not be simpler. Begun in the 1950s, stagnating in the 1970s, and reemerging in the 1980s, only to stall once again at the millennium, there is great concern over the nature of this challenge. With consideration to its scope alone, integration is obviously European-wide. By basic definition the nature of European integration as a challenge must represent a concern of great magnitude. It involves, at its core, the European Union (EU), EU associate states, and the European Free Trade Association states (EFTA), all of which include nearly every country in western and central Europe, as well as Scandinavia. In the thinktank project mentioned above, every single group involved listed the integration process

as the single most pressing concern of the 1990s and beyond (Ross, 1995:1). The possibility that a state would not have a vested interest in the terms of integration is marginal. Even states which do not belong to any of the above organizations, such as the Russian Federation, still have concerns that need to be addressed with respect to the challenge of integration.

The potential for administrative involvement in solving the challenge and the salient allocation and mobilization of resources also require little evidence. As with the scope of the integration challenge, the ability of administrative elites to become involved in the solution to the problem is expected considering the nature of the dilemma. Throughout the history of European integration, administrative elites, represented by such individuals as Jean Monnet and Jacque Delors, have been the responsible architects of policies designed to facilitate the process. Although there is a great deal of political involvement in the process of integration, the details of integration fall to the technical experts who, as discussed in the first section, are responsible for the implementation of policy. Between 1992 and 1999, the integration process stalled, leaving Europe in the midst of an unfinished conversion (Ross, 1992:2-4). The introduction of the Euro in 1999 was thought to help jumpstart the process again, but its poor performance in the two years since its introduction, has done little to alleviate the concerns of a number of EU member states. In such a time, the role of the administrative elites is of great importance in adjusting policies between and among the various states so that the integration process can move forward.

Integrating all three spheres into a single unit also requires some resource expenditure. The cost of altering political, social and economic structures both in fiscal and political terms, is a long and involved process. Add to that the desire of many of the newly liberated East European states who wish to join in on the integration venture, and the cost of accommodating their needs or proffering alternatives calls for an even greater mobilization and utilization of resources. Open borders, free movement of goods and labor, common currency, each requires resources for implementation and each places a burden on the administrative elites to allocate the resources effectively.

Demonstrating that political, social, and economic integration exists as a challenge with a specific locus in time or delimited physical properties is equally simple. While European integration began in the 1950s with the creation of the European Coal and Steel Community (ECSC), the Atomic Energy Commission (Euratom), the European Economic Community (EEC), and continued with their merger in 1967 into the European Community (EC), the realities of European integration have not been that successful. The EC was considered a model of integration, but the fact was that disagreement and reluctance in moving toward integration led to a period of stagnation and near collapse for the EC in the 1970s (Ross, 1995:2-4, Ross, 1992:487). In the mid-1980s a process of expansion began, with the approval of the Single European Act (SEA) by the EC. The SEA provided for the continued integration of the EC and the eventually opening of borders by the end of 1992,

moving the EC from a purely economic union into one with political and social considerations as well (Ross, 1995:2). The process of growth was renewed and until 1992 was well on the way to becoming "the international beacon for humane capitalism," and a developing political influence equal to its economic capabilities. (Ross, 1992:488) Since 1992, however, with the repudiation of the "Maastricht Treaty," and the instability of the Euro, some states within Europe, most notably Great Britain, have balked at the idea of continuing this rapid pace of integration, creating a crisis point for the integration process. The recent EU Summit in Nice and its support for expansion notwithstanding, the path toward continued integration is still littered with obstacles that are a direct result of operative policy choices over the last ten years. Thus, the locus of time and the physical properties of the integration dilemma are focused on the past ten years, when, at the urging of the European Commission, efforts were made to accelerate the process.

Conclusion

Based on the methodology of this study, nationalism, ethnic questions, minority rights, migration, and the continued integration of the European Union all appear to qualify as challenges for the European administrative elites. Yet to say that these few issues are the sole problems faced by elite administrators would be naive. The work of administrative elites is to guide states and societies through both placid and turbulent times, creating policies to address the needs of the masses and promoting stable social, political, and economic environments. While the above issues are currently of significant importance, they will not always remain so. There are constant challenges waiting in the wings, some are on the verge of international significance, while others may be as yet regional in nature. Issues of race, aging native European populations, and questions of cultural identity by traditional majoritarian groups are all potential challenges at a European-wide level. Some issues, such as migration or questions relating to European Union may not be addressed for years to come, while nationalist and minority issues may soon be resolved as a matter of administrative policy, or shrink to regional concerns as states work independently to solve their problems. The important concern here is to note that while it may not be difficult to discern challenges facing these elites, the nature of the challenges will constantly be changing, with old challenges possibly resurfacing after time. Thus the role of administrative elites, regardless of the nature of state and social development doctrines, is of great importance for the prosperity of Europe in the 21st Century.

Notes

1. A number of scholars have studied the nature of elites, and ideas regarding their roles, positions, etc. are many. Max Weber's contribution to elite theory is the notion of *Verstehen*, or understanding. It was his belief that social events were caused by voluntary human actions, and not by the influences of social structure. Theda Skocpol, more of the structuralist school, believes that only after the study of the "institutionally determined situations and relations of groups within society" can one

make sense of the nature of elites. Vilfredo Pareto's famous contribution to the analysis of elites was the notion of the "circulation of elites," were groups of elites would replace one another within the institutional structures of society. See Farmer, chptr. 1 for a thorough overview of theoretical approaches. Other sources for theoretical approaches, in particular definitions of functionalism and structuralism, include Roy C. Macridis and Bernard E. Brown, Comparative Politics: Notes and Readings (Homewood, Illinois: The Dorsey Press, 1964); Gabriel A. Almond and G. Bingham Powell, Comparative Politics Today: A World View, (Harp-Collins Publishers, 1992); and Gabriel A. Almond and James S. Coleman, The Politics of the Developing Areas, (Princeton: Princeton University Press, 1960).

2. The classic-structural functionalist approach is concerned with asking the appropriate questions in social science research, most notably; What structures are involved? What functions have been performed? What functions take place within a given structure? This study does not look to exam the structures, nor does it try to identify the depth of function being performed. The assumption is made that the structures exist and within those structures are the delegated tasks of administrative elites. International Encyclopedia of the Social Sciences, vol. 7 (New York: MacMillan and the Free Press, 1968), p. 22.

3. There is little that is essentially different between the composition of administrative and bureaucratic elites. There is also little agreement as to exactly what each entails. Armstrong's pithy statement is supported by Aberbach and company, while Farmer observes institutional differences, essentially revolving around the notion of power. For this study, administrative elites are understood to differ from bureaucratic elites primarily in the methods of recruitment, family origins, position within the institutional structures of a state, and the relative autonomy of elite positions. Armstrong, p. 6, Farmer, p. 7, Joel D. Aberbach, Robert D. Putnam, and Bert A. Rockman, Bureaucrats & Politicians in Western Democracies (Cambridge and London: Harvard University Press, 1981) pp. 84-85.

4. In no state of the 1992 programme survey did any of the participants list race as an imminent threat to the stability of their state or to that of Europe. Jacquemin and Wright, chapters 6-17.

5. Race is a separate issue area infrequently studied within a European context. Most racial associations are made with respect to nationalist, ethnic, or immigration issues. See Fascist Europe: The Rise of Racism and Xenophobia (London: Frank Cass & Company Ltd., 1994), edited by Glyn Ford.

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TÜRKİYE'DE DEVALÜASYON UYGULAMALARI (1923-2000)

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ÖZET : Devalüasyonun Türkiye uygulamaları, detaylı olarak incelenmiştir. İlk olarak devalüasyonun kapsamı ve uygulamaları açıklanmıştır. Bu açıklamalar detaylı olarak yapıldıktan sonra 1923-2000 yıllarında Türkiye'de devalüasyon uygulamaları açıklanmıştır.

Anahtar kelimeler: *Sabit döviz kuru, değişken kur sistemleri, döviz piyasaları, resmi döviz kurları, serbest döviz kurları, devalüasyon*

ABSTRACT : Devaluation, has been examined in details in terms of its applications in Turkey. Firstly, the content and application of devaluation have been explained. After these explanations have been clarified in details and these applications of the devaluation has been stated between 1923-2000.

Key words: *Fixed exchange rate, fluctuated exchange rate, exchange markets, official exchange rate, free exchange rate, devaluation*

1. KAPSAMI

Sabit döviz kuru sistemlerinde, devlet tarafından resmi döviz fiyatlarının (kurunun) yükseltilmesi, bir ülke milli parasının dış değerinin düşürülmesidir.

Milli paranın değeri, diğer milli paralar karşısında, satın alma gücü değerinin düşürüldüğü oranda zayıflar. Örneğin, 1990 yılında bir Amerikan doları üçbin TL. iken, 1999 yılı sonlarında ise (417.000) TL.'ye varmıştır. Ocak ikibinbirlerde ise yedi yüz bin TL.'e yaklaşmıştır.

Değişken kur sistemlerinde, döviz piyasalarında yabancı para kurları, arz ve talep kurallarına bağlı olarak yükselir. Ekonomi literatürlerinde arz ve talep kurallarına bağlı olarak, yabancı para kurlarının yükselmesine devalüasyon deyimini kullanamayız. Döviz kurları genellikle USA Doları bazında yükseltilir. Bu nedenle devalüasyon yapmak isteyen ülke, doların resmi fiyatını yükseltir.

Devalüasyon çok çeşitli yönleri ile kompleks bir problemdir. Psikolojik, sosyal, ekonomik ve politik faktörler göz önünde alınarak düşünülmesi gerekir. Devalüasyon bir para sistemi değildir. Mevcut para sistemi içindeki para birimine psikolojik, sosyal, ekonomik ve politik faktörlerin etkisi ile yapılan ekonomik bir operasyondur.

Devalüasyonu, meydana getireceği sonuçları önceden saptanabilen bir sistem olarak da kabul etmek mümkün değildir. Çünkü devalüasyon operasyonuna baş vuran ülkelerin bazıları, birbirlerine tamamen zıt olan önlemleri de aldıkları görülür.

Devalüasyon, genel olarak ödemeler bilançosu açık veren ülkelerde, ödemeler bilançosu açıklarını kapama amacı ile yapılır. Çünkü devalüasyon ithal girdilerinin fiyatlarını yükseltip, ihracat çıktılarının fiyatlarını düşürür. Bu nedenle yıllık ithal girdilerinin toplam hacmi azalırken, yıllık ihraç çıktılarının toplam hacmi yükselir. Böylece devalüasyon yapılan ülkelerde döviz tasarrufu ve döviz girdisi sağlanır. Bu şekilde ödemeler dengesi açıklarını kapatma olanakları doğmuş olur. Devalüasyonun ülke ekonomisinde bu iyileştirici uygulamaları yanında, devalüasyonun ithal girdileri fiyatlarını yükseltmesi nedenleri ile ülke düzeyinde maaliyet enflasyonunu yükseltme tehlikeleri belirir. Bu nedenle, devalüasyon operasyonlarından sonra, iç fiyatların sabit tutulması zorunluluğu vardır. Ayrıca ihraç mallarının stoklarının bulunması ve de ihraç malları arzını çoğaltabilme olanaklarının olması gerekir.

Ekonomik Terimler Ansiklopedisi'nde devalüasyon'un kapsamı genel olarak şöyle açıklanmaktadır; Devalüasyonun dış ticaret bilançosunu iyileştirici etkileri iki kanaldan ortaya çıkar. İthalat girdilerinde daralma ve ihracat girdilerinde artış. Devalüasyon, ithal malların ulusal para cinsinden fiyatlarını yükseltir. Bu da ithalatı azaltıcı etki yapar ve böylece bir döviz tasarrufu sağlanır. Diğer yandan devalüasyon, yerli malları yabancı para cinsinden ucuzlatarak, onları yabancılara

daha ucuz bir duruma getirir. Bu da ihracatı özendirerek döviz kazandırıcı etkide bulunur. Bu iki olumlu etki de dış açığın kapanmasına yol açar. Devalüasyon ithal mallarını pahalılaştırarak ülkede bir maliyet enflasyonu başlatabilir. Ayrıca, dövizle ödenecek dış borçların yükünü arttırır. Sabit kur rejimlerinin uygulandığı ülkelerde, hükümetler devalüasyonu uyguladıkları ekonomik ve mali politikaların başarısızlığı olarak görmüş ve önemli dış açıklara karşın devalüasyondan kaçmışlardır. Devalüasyonun başarısı için belirli koşullar gerekir. Bunlar arasında devalüasyondan sonra iç fiyatların sabit tutulması, ihraç mallarının dış ve ithal mallarının iç talep esnekliklerinin yüksek olması ile elde mevcut yeterli ihraç malları stokunun bulunması, ya da ihraç malları arzının kolayca arttırılabilmesi başta gelir. Teorik analizlerde devalüasyonu inceleyen değişik yaklaşımlar vardır. Bunlar; Esneklik Yaklaşımı, Toplam Harcamalar Yaklaşımı ve Parasalcı Yaklaşım'dan oluşmaktadır.[1]

2. DEVALÜASYON UYGULAMALARI

Her devalüasyon, uygulandığı ülkenin ekonomik yapısına göre özellikler arzeder. Örneğin bazı ülkelerde develüasyonlar sosyal reformlardan sonra yapılır. Bazılarında fiyatların yükselmeye başladığı ve yükselmenin devam ettiği veya enflasyon ağırlığının baş gösterdiği sıralarda, bazı ülkelerde ise uzun veya kısa dönemlerle devam eden bir deflasyondan sonra, devalüasyon opresayonlarının yapıldığı görülmüştür.

Örneğin, Birinci Dünya Savaşı'ndan sonra, Fransa ilk devalüasyon operasyonunu yapmıştır. Bu devalüasyon operasyonunda, Fransız Hükümeti fiyatların yükselmeyeceği hususlarında, Fransız halkına garanti vermiştir. Fakat devalüasyon operasyonundan bir süre sonra, fiyatların hızla yükselmesini Fransa Hükümeti önliyememiştir.

Devalüasyon operasyonları, hiçbir zaman ekonomisi istikrarlı, dış açığı olmayan bir ülke için uygulanmaz. Mutlaka ödemeler bilançosunda, ithalat-ihracatında, iç ve dış fiyatlar gibi ülke ekonomisinin çeşitli alanlarındaki krizler nedenleri ile devalüasyon operasyonlarına gidilir. Örneğin, devalüasyon'a giden ülkenin, devalüasyondan önce ihracatında azalma, ithalatında sürekli çoğalma vardır. Bu da o ülke ekonomisinin, ödemeler dengesinin ülke aleyhine dönmesi nedenleri ile zor durumlara sokacaktır. Devalüasyon operasyonu ile milli paranın dış değerinin düşürülmesi sonucunda, ithalatda azalma, ihracatda çoğalma olacaktır. Dış ülkelerde büyük ihaleler kazanmış müteahhitlerin, çeşitli yatırımlarda bulunan iş adamlarının, ellerindeki tasarruf meblaglarını yabancı bankalarda biriktirenlerin ve de çeşitli alanlarda ücret karşılığı çalışanların, varsa diğer kaynakların yabancı kurumlarda muhafaza edilen dövizler değer kazandığından, devalüasyon yapan ülkeye akacaktır. İşte devalüasyon yapmanın en önemli temel amaçlarından biri de budur.

Geri kalmış ülkeler, ithal mallarına daima muhtaçtırlar. Çeşitli endürsti ve diğer

[1] SEYİDOĞLUHalil, Ekonomik Terimler Ansiklopedisi, 2. Baskı, İstanbul, 1999, s.109

çeşitli alanlarda zorunlu ithal mallarını ithal etmek zorundadırlar. Devalüasyon operasyonu ile pahalıya ithal edilecek malların fiyatları, ne kadar önleyici önlemler alınırsa alınsın, iç fiyatları etkiliyecek ve yükseltecektir. Örneğin, ülkemizde uygulanan 1946, 1958, özellikle 24.Ocak.1980 yılları devalüasyonları ve 1980'lerden sonra günümüze kadar uygulanan devalüasyonlar fiyatları etkilemiş ve yükseltmiştir.

Devalüasyona karar veren ülkeler, bu kararı vermeden önce, gerekli bütün ekonomik önlemleri, özellikle iç fiyatların yükselme eğilimlerini kesin olarak önleyici gerekli bütün kararları mutlaka almak zorundadırlar. Özellikle geri kalmış ülkeler bu önlemler üzerinde ciddiyetle durmak zorunluğu içerisindedirler.

Bu konular ile ilgili yıllar öncesi öğrencisi olduğum çok değerli para ekonomisi hocam rahmetli Prof.Dr.Burhan Zihni Sanus, derslerinde devalüasyon ile ilgili görüşlerini şöyle açıklardı; "Bir ülkenin içinde bulunduğu darboğazlardan devalüasyon yolu ile kurtulabilmesi, özellikle parasal istikrara kavuşabilmesi için, en uygun zamanı, milli ekonomiye en uygun devalüasyon oranını seçmesi ve alınan kararların dikkatle uygulanması, özellikle fiyatları yükseltici operasyonlardan kaçınılması şarttır. Bir ülke ödemeler bilançosundaki dengeyi, parasının kıymetini düşürerek ayarlamak istediğinde, devalüasyon işlemlerinin başarılı olabilmesi için, iç fiyatların yükselmemesi şarttır. Bu nedenle devalüasyon oranının saptanması için detaylı bir analiz yapılması gerekmektedir.

Paranın kıymetini stabilize edebilmek için bütçe dengesinin oluşması ve muhafazası gerekir. Devletin giderlerini vergilerle karşılayabilmesi zorunluğu nedenleri ile saptanacak devalüasyon oranlarına nazaran, vergi randımanının nasıl gelişeceğini göz önünde bulundurmak gerekir. Saptanan devalüasyon oranı, ülkenin ekonomik faaliyetleri üzerinde olumsuz etkiler yaparsa, bundan devlet bütçesi büyük zararlar görebileceği gibi, ülke ekonomisi de çok ağır yara alır.

Yukarıda belirttiğimiz gibi, Devalüasyon uygulamalarının temel amacının, dış dengeyi sağlayabilmek için ulusal paranın dış değerini düşürerek, ithalatı pahalılaştırıp, ithalatı ucuzlatmak, döviz girişini hızlandırarak, dövizçıkışını yavaşlatmaktır. Dış ödemelerde açık veren, yani ihracatı ithalatından az olan ülke, milli paranın dış değerini düşürerek, ihracatını artırıp, ithalatını azaltabilir. Bunun sonucunda da dış denge sağlanır ve açık kapanır. Fakat devalüasyon uygulamaları ile bu temel amacına da aşağıdaki nedenlerle her zaman erişilemediği görülmektedir.

Devalüasyon yapılan ülkede; ihraç malları üretimi ve arzı, fiyatlar yükselse de kolaylıkla arttırılamıyorsa, para arzı ayarlamasının ihracatı çoğaltan etkisi olamaz. Yabancılar için, devalüasyon yapan ülkenin ihraç malları fiyatlarının düşmesi fazla bir önem taşımıyorsa, ihracat miktar olarak genişlese de ihracattan elde edilen dövizde bir artış beklenemez.

Devalüasyon yapılan ülkede, ithal malları zorunlu ihtiyaç malları ise, ya da halkın yabancı mallara karşı özel bir güveni, rağbeti veya tutkusu varsa, ithal mallarının

fiyatları yükseldiği zaman ithalat miktar olarak daralsa bile, ithalat için harcanan döviz azalmaz.[2]

3. TÜRKİYE'DE DEVALÜASYON UYGULAMALARI

3.1. 1931 YILI DEVALÜASYONU

Türkiye'de doların fiyatı 211 kuruş olarak ayarlanarak, ilk devalüasyon 1931 yılında yapılmıştır. Fakat 1931 yılında yapılan devalüasyonun, devalüasyon mu yoksa o yılların ekonomik şartları gereği kısa vadeli TL değerinin düzenlenmesi mi olduğu uzun süre tartışılmıştır. Çünkü ekonomi literatürlerinde açıklanan devalüasyon teorilerine en uygun olanının, Türkiye'de 7 Eylül 1946 yılında yapılan ilk devalüasyon olduğu görüşleri ağırlık kazanmıştır.

3.2. YEDİ EYLÜL 1946 DEVALÜASYONU

1923-1946 yıllarında Türkiye'de, yukarıda da kısaca özetlediğimiz gibi ilk olarak en ağır devalüasyon operasyonu , 7 Eylül 1946'da uygulanmıştır.

1946 yılında Türkiye Cumhuriyetinin başında Recep Peker Hükümeti bulunuyordu. Türk Lirası'nın İkinci Dünya Savaşı içerisinde, iç ve dış değerleri arasında önemli derecede farklar belirmiştir. Recep Peker Hükümeti, bu farkı yok etmeye kesin olarak karar vermişlerdi. 1931 Yılından 1946 yılına kadar tam onbeş yıl, Türk Lirası değerine hiç dokunulmamıştı. Türk ekonomisi bu zaman zarfında monoton bir fasit daire içinde, kendi çapındaki hamlesi ile başbaşa idi. Recep Peker Hükümeti, 1946 yılında Türk Parasına gerçek değerin verilmesini istiyordu. Bu gerçek değeri vererek, dış fiyatlarla iç fiyatlar arasındaki farkın ortadan kaldırılması sağlanacaktı. Diğer taraftan da dış ticaretteki sun'i önlemler ortadan kaldırılacaktı. Dış ticaret canlandırılacaktı. Sonuçta üretimin çoğaltılması düşünülüyordu.

1943 yılından önce düşük oranda bir mini devalüasyon yapıldı. Esasında bu önemli bir devalüasyon operasyonu sayılmazdı. 1946 yılında, "7 Eylül Kararları" diye anılan devalüasyon ile Türk Lirasının değeri yüzde kırk'a yakın bir oranda düşürülmüştür. Bir Dolar, İki Lira 82 kuruş (2.82) olmuştur. Türk Parasının değeri çok aşağı tutulmuştu. Çok aşağıda olan Türk Parasının kıymeti ise, ithal mallarının fiyatlarını artırmış, yurt içindeki fiyat istikrarını bozmuştu. Hükümet bol mal ithal etmek istiyor, ithal edilecek bol mallarla dahildeki fiyat hareketlerini rekabetle ayarlıyabileceğini umuyordu. Bu çeşitli ekonomik etki ve faktörlerle gerçekleşemedi.

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[2] Devalüasyon ile ilgili;Ayr.bilg.için.bknz.,
- WOLLArtur, Allgemeine Volkswirtschafts-Lehre, München. 1994, s.487-521
- STREIT Manfred, Theorie Der Virtschaftspolitik, Düsseldorf. 1989, s.193-271
- BUSCHER Herbert, Modelle Der Neuen Klassischen Makroökonomie, München. 1998, s.41-49
- KEPENEK Yakup, Türkiye Ekonomisi, İstanbul. 1994, s. 435-443
- PARASIZ İlker, Makroekonomi, Bursa. 1999, s.282-301
- HATİPOĞLU Zeyyat, Makroiktisat, İstanbul. 1999, s.304-309
- ÜSTÜNELBesim, Makroiktisat, İstanbul. 1990, s.290-297
- SEYİDOĞLU Halil, Ekonomi Ansiklopedisi, İstanbul. 1999, s. 109

1946 Devalüasyonu ağır olumsuz sonuçlarla sonuçlandı. Üretimde beklenilen sonuç sağlanamadı. Devlet giderleri arttı. Bütçe açıkları çoğaldı. Nakit hacmi yükseldi. Türk parasının satınalma gücü düştü. İthalat çoğaldı. İhracat düştü. Oysaki daha öncede belirtildiği gibi devalüasyonların temel amacı, ithalatın azaltılması, ihracatın çoğaltılmasıdır.

O yıllarda işadamlarımız, çalışan insanlarımız, bugünkü gibi çeşitli dış ülkelere yayılmamışlardı. Ayrıca dış finansman kurumlarında, bankalarda tasarruf meblağları olanlar olmadığı için, dışarıdan bu yollardan döviz girdisi de sağlanamadı.
Bunların yanında 1946 devalüasyonunda, dış ticaret bilançosundaki açıklar büyüdü. Döviz stokları azaldı. Hayat pahalılığı artmaya başladı. İşsizlik ülkenin dörtbir yanına yayıldı.

1946 yılı devalüasyonu, Türkiye Cumhuriyeti kurulduğundan bu yana, devalüasyon kapsamında ilk defa uygulanan gerçek bir devalüasyon olmuştur. Başarılı olmayan ilk devalüasyon da 1946 yılı devalüasyonu olmuştur. Nitekim araştırmalarımızda görüleceği gibi 1946 yılından sonra uygulanan devalüasyonlar da Türkiye ekonomisi arzu edilen sonuçları verememişlerdir.

1950 Seçimlerinde, İktidar Partisi olan CHP, iktidardan düştü. İktidar Hükümeti 1950 yılında, iktidarı devrettiğinde, başarısız olan 1946 devalüasyonunun ağır tahribatlarına rağmen, Türk parasının iç ve dış değeri, 1950 yılından sonraki dönemlerden çok daha istikrarlı idi.

3.3. 1958 YILI DEVALÜASYONU

1946 Devalüasyonunu ağır dille eleştiren, o zamanın güçlü muhalefet partisi olan Demokrat Parti, 1950 yılında iktidar olduktan 8 yıl sonra, 1958 yılında, bu sefer yüksek oranda devalüasyon operasyonu uygulanmıştır. 1958 Yılı devalüasyonu da beklenilen sonucu verememiştir. İhracat tıkanıklığına faydalı yönleri olmuşsa da zorunlu ithal mallarında büyük darlıklar ve fiyat yükselmeleri olmuştur. Yükselen ithal malları fiyatları, iç fiyatları yükseltmiş ve ülkenin ekonomik istikrarını sarsmıştı. Paranın dış piyasa değeri ile iç piyasa değeri arasında belirli farklar, hergeçen gün büyüyordu. İç piyasadaki istikrarsızlık kendini toparlayamıyordu. 1950 yılından sonra birden girişilen enflasyonist yatırımların ve altın karşılığı kağıt para sisteminden uzaklaşılarak, karşılığında altın stoku bulunmayan dinamik kağıt para sistemi uygulamasının doğurduğu fiyat yükselmeleri, devalüasyon operasyonundan sonraki yıllarda da devam ediyordu. Sabit ve dar gelirli vatandaşın geçim sıkıntısı, hergeçen artıyordu. Özellikle, Türk Parasının dış piyasalardaki değerinin sürekli olarak düşmesi, ülke ekonomisinin itibarını sarsıyordu. Bütün bunların yanında, 1958 yılı devalüasyonu, ödemeler bilançosundaki bazı önemli boşlukları kapatmış, fakat beklenilen ekonomik dengeyi sağlıyamamıştır. 4 Ağustos 1958 tarihinde "İktisadi İstikrar Tedbirleri" adı altında yapılan bu devalüasyonda, Türk Lirası %220 değer kaybederek, bir Dolar (900) kuruş (9) TL. olmuştur.

3.4. 10 AĞUSTOS 1970 DEVALÜASYONU

1958 Yılından 12 yıl sonra 1960 ihtilalinden aşağı yukarı 10 yıl sonra iktidara gelen Adalet Parti hükümeti %70'lere varan 3. ağır devalüasyonu yapmıştır.

Belirli dönemlerdeki ihracat rakamlarımızın memnuniyet verici olmaması, ithalatımızın ihracatımıza göre sürekli olarak çok daha fazla büyümesi, fiyatların iç ve dıştaki istikrarsızlığı, ödemeler bilançomuzdaki dengesizlik her zaman olagelen milli sermayemizin yetersizliği, finansman kaynaklarımızdaki kıtlığımız ve özellikle diğer ekonomik ve sosyal faktörlerimiz nedenleriyle Türk Ekonomisi'nde 10 Ağustos 1970 devalüasyonu da beklenilen sonucu sağlayamamıştır.

İhraç edilemiyen milli ürünlerimizin ihracını sağlamak, dış ticaret dengemizde, milli üretimimizi çoğaltmada, dış ülkelerdeki vatandaşlarımızın dövizlerinin Türkiyeye akmasında, turizm gelirlerimizin çoğalmasında, 10.Ağustos.1970 Devalüasyonunun faydaları olmuş fakat, Türk Ekonomisinin muhtaç olduğu istikrarı sağlayamamıştır. Paramızın dış değerinin düşmesi, içerdeki fiyatların sürekli olarak yükselmelerine neden olmuş, yeni vergiler ve diğer zamlar, fiyatları daha da yükseltmiştir. İthalat ve ihracat açığı yeterli şekilde kapanamamış, ödemeler bilançosundaki açık devam etmiştir.

Dış ticaret açığını kapamak, özellikle milli ürünlerin dış satımını artırarak, Kalkınma Planının amaçları düzeyinde gerçekleştirmek amacı ile 10.Ağustos.1970 devalüasyonu ile Türk Lirası %66 oranında devalüe edildi. Yani Dolar karşısında Türk Lirası %66 değer kaybı ile bir Dolar 15.15 oldu. (Onbeş lira onbeş Kuruş)

3.5. 1970-1980 KUR AYARLAMALARI (DEVALÜASYONLARI)

Yukarıda özetlediğimiz 1970 devalüasyonundan sonra, 1974 yılından itibaren Dolar, TL. karşılığı yükseltilmeye başlandı. Yılda birkaç kez yapılan bu "ayarlamalar" sürekli devalüasyon izlenimi bırakarak, TL.'nin dış değerini belirsiz hale getirdi. 1979 yılı Nisan ayında %30 oranında ve aynı yılın temmuz ayında %88.4 (pirimli) oranlarında devalüasyonlar yapıldı. Bir dolar 47.80 TL. (47 Lira 80 Kuruş) oldu[3].

3.6. 24.OCAK.1980 DEVALÜASYONU

24 Ocak 1980 yılı devalüasyon operasyonu ile birlikte alınan ekonomik önlemler, Türkiye Cumhuriyeti ekonomi tarihine "24. Ocak. Kararları" olarak geçmiştir.

24.Ocak.1980 yıllarında; yüksek enflasyon ve hergün artan hayat pahalılığı, döviz dar boğazı, bazı temel maddelerin yokluğu, kuyruklar ve karaborsa, düşen üretim ve ulaşım faaliyetlerinin aksaması, enerji darlığı, yoğunlaşan grevler, hızla artan

3 Ayr. bilg. için bknz. KEPENEK Yakup, Türkiye Ekonomisi, İstanbul. 1994, s.253-256
4 Ayr. bilg. için bknz. KORAY Başol, Türkiye Ekonomisi, İzmir.1998, s.49-53

işsizlik gelir dağılımının bozulması, anarşinin artması, petrol sıkıntısı, vergi sistemindeki bozukluk, kamu iktisadi teşebbüslerinin aşırı zararları nedenleri ile 24.Ocak.1980 devalüasyonu ile Türk Lirası %33 oranında devalüe edilmiştir. 24.Ocak.1980 yılında yapılan devalüasyonla; enflasyon oranını düşürmek, enflasyonu körükleyen KİT'leri yeniden organize etmek, döviz gelirlerimizle giderlerimizi kapatmak, ihracatı artırarak dış ödemeler dengesini düzenlemek, sermaye piyasasını düzenlemek, yatırımları hızlandırmak, para arzındaki genişlemeyi önlemek gibi önemli amaçları kapsıyordu.

Devalüasyonla Döviz kuru 1980 yılında (90) TL. i bulmuştur. 1981 de (133), 1982 de (191) TL. olmuştur. Bu devalüasyonla faiz oranları yükselmeye başlamış, bunun yanında işsizlik çoğalmıştır. Para değerinin sürekli ve hızlı düşüşü, özellikle sanayi kesiminde girdi maliyetlerinin aşırı derecede yükselmesine neden olmuştur. Firmalar finansman sıkıntısıyla karşılaşmışlardır. Finansman sıkıntısı faiz oranlarını yükseltmiştir. Piyasa maliyet enflasyonu içerisine girmiştir. Kitlerin zararlarını kapatmak, 24.Ocak kararlarının temel amaçlarından biriydi. Açıkları kapatabilmek için hemen hemen bütün mal ve hizmet ürünlerine ard arda zamlar yapıldı. Aşırı zamlar fiyatların yükselmesini körükledi. Kit açıkları büyüdü. 1980 Yılında toptan eşya fiyatları yüzde yüz artmıştır.

24 Ocak kararları programı, kısa dönemde istikrarı sağlayacak önlemler yanında, uzun sürede uygulamaya devam edilmesi gerekli bir kalkınma stratejisini ortaya koymuştur. Önemli ölçüde de başarılı olmuştur.

3.7. ONİKİ EYLÜL 1980 SONRALARI DEVALÜASYONLARI

Devlet müdahalesi azaltılmış, özel girişimcilik ekonomik faaliyetlerde esas kabul edilmiş, ticaret alanında serbestlik getirilmiş, faiz hadlerinin saptanması bankalararası serbest bırakılmış, döviz alım satımları da serbest bırakılmıştır.

1980 yılından sonra serbest döviz alım satımına geçilmekle, kapalı ve sık sık yapılan kur ayarlamaları adı altında "kapalı devalüasyon" larla, 1980 yılında %37 oranındaki devalüasyonla (90) TL. olan doların değeri, 1990 yılında (3.000) TL. olmuştur. 1990 yılından 1995 yılı aralık ayı başlarına kadar aynı devalüasyon uygulamaları ile, doların değeri (55.000) TL'e yaklaşmıştır.

3.8. 1995 YILI DEVALÜASYONU

1995 yılında %13 oranında bir devalüasyon daha yapılmıştır.

1998 yılı sonlarında doların değeri (üçyüzbin) TL'e yaklaşmıştır. 2001 Yılı başlarında ise doların değeri (yediyüz bin TL.)'ye yaklaşmıştır.

4. GENEL OLARAK, 1923-2000 YILLARI DÖVİZ KURLARI; AMERİKAN DOLARI VE ALMAN MARKI BAZINDA HER YIL İÇİN ŞÖYLEDİR;

Yıl		**$**			**DM**	
1924	Ortalama	1.67	Lira-Krş.	Ortalama	0.44	
1930	"	2.07	"	"	0.46	"
1931	"	2.12	"	"	"	"
1932	"	2.11	"	"	"	"
1933	"	2.11	"	"	"	"
1934	"	1.66	"	"	"	"
1935	"	1.26	"	"	"	"
1936	"	1.26	"	"	"	"
1937	"	1.26	"	"	"	"
1939	"	1.26	"	"	"	"
1940	"	1.28	"	"	"	"
1941	"	1.31	"	"	"	"
1942	"	1.31	"	"	"	"
1943	"	1.31	"	"	"	"
1944	"	1.31	"	"	"	"
1945	"	1.30	"	"	"	"
1946	"	2.82	"	"	0.66	"
1950	"	"	"	"	"	"
1951	"	"	"	"	"	"
1952	"	"	"	"	"	"
1953	"	"	"	"	"	"
1954	"	"	"	"	"	"
1955	"	"	"	"	"	"
1956	"	"	"	"	"	"
1957	"	"	"	"	"	"
1958	"	"	"	"	"	"
1959	"	9.00	"	"	2.14	"
1960	"	9.00	"	"	2.14	"
1961	"	9.00	"	"	2.25	"
1962	"	"	"	"	"	"
1963	"	"	"	"	"	"
1964	"	"	"	"	"	"
1965	"	"	"	"	"	"
1966	"	"	"	"	"	"
1967	"	"	"	"	"	"
1968	"	"	"	"	"	"
1969	"	"	"	"	2.46	"
1970	"	1485	"	"	4.09	"
1971	"	14.00	"	"	4.34	"
1972	"	14.00	"	"	4.34	"
1973	"	14.00	"	"	5.25	"

Yıl		$			DM	
1974	Ortalama	13.88	Lira-Krş.	Ortalama	5.65	"
1975	"	15.00	"	"	5.95	"
1976	"	16.50	"	"	6.85	"
1977	"	19.13	"	"	8.80	"
1978	"	25.00	"	"	13.87	"
1979	"	35.00	"	"	20.22	"
1980	"	89.25	"	"	45.16	"
1981	"	132.30	"	"	58.35	"
1982	"	184.90	"	"	78.25	"
1983	"	280.00	"	"	101.75	"
1984	"	442.50	"	"	141.20	"
1985	"	574.00	"	"	233.15	"
1986	"	755.90	"	"	387.95	"
1987	"	1018.35	"	"	638.65	"
1988	"	1813.02	"	"	1022.86	"
1989	"	2311.37	"	"	1364.45	"
1990	"	2927.13	"	"	1947.53	"
1991	"	5074.83	"	"	3339.81	"
1992	"	8565.85	"	"	5302.66	"
1993	"	14458.03	"	"	8347.69	"
1994	"	38418.00	"	"	24683.00	"
1995	"	59501.00	"	"	41527.00	"
1996	"	106682.00	"	"	68579.00	"
1997	"	203700.00	"	"	114600.00	"
1999	"	417000.00	"	"	232000.00	"
2000	Ekim "	687000.00	"	"	295000.00	"
2001	Ocak "	680000.00	"	"	325000.00	"

SONUÇ

Yukarıdan beri açıkladığımız devalüasyonun kapsamı, uygulanma zorunluluğu, amaçları ve uygulanma yöntemlerini ve Türkiye'deki uygulamalarını göz önünde bulundurduğumuzda, görebildiğimiz kadarıyla 1923 yılından günümüze kadar ülkemizde yapılan devalüasyon uygulamalarının hiçbiri beklenilen olumlu sonuçları verememiştir. Yukarıda da detaylı olarak açıkladığımız gibi, ekonomisi sağlıklı, ithalat ve ihracatı, ödemeler bilançosu dengeli ülkelerde, zaten devalüasyon uygulamalarına gerek duyulmamaktadır.

Ekonomisi darboğazlarda olan ülkelerde gerekli bütün önlemler alınarak ekonomiyi darboğazlardan kurtarabilmek amacı ile belli süreler ve olumlu sonuçlar için uygulanır. Ekonomisi sağlıklı, üretim gücü yeterli olan ülkeler bazı dönemlerde girdikleri darboğazları aşmak için gerekli önlemleri alarak uyguladıkları devalüasyon uygulamalarını fazla tahribat görmeden atlatabilirler. Fakat Türkiye

gibi eğitim seviyesi, milli tasarruf ve üretim gücü henüz yeterli olmayan milli geliri, bölgeler ve insanlar arasında dengeli hale gelememiş, aşağı yukarı her yıl bütçesi açık veren, iç ve dış borçları kabarık ve diğer ekonomik ve sosyal sorunları bulunan ülkelerde, devalüasyonun tahribatlarını önleyebilmek ve olumlu sonuçlar alabilmek çok güçtür. Bir süre için ihracatın çoğalması ile döviz girdilerini arttırmak mümkündür. Ödemeler dengesini belli bir düzeyde olumlu yönlere eriştirmek de mümkündür. Fakat kalkınmakta olan ülkelerin ithal girdilerine ihtiyaçları fazla olduğundan, devalüasyon nedenleri ile ithal mallarının yükselen fiyatları ülkede hemen hemen bütün üretim alanlarında maliyet enflasyonunu yükseltecek ve bu yükseliş de kısa bir sürede ihraç mallarının fiyatlarını, ağır ağır da olsa arttıracaktır. Bu yükseliş sonucunda ihracatta yavaş yavaş azalmalar görülecektir. Enflasyon yine tırmanışına devam edecek, sabit gelirlilerin sıkıntıları ve diğer ekonomik darboğazlar ortadan kalkmayacaktır. Yine devalüasyon yapılmadan önceki darboğazların ağır koşullarına dönülebilecektir. Nitekim Türkiye'de uygulanan her devalüasyon sonrasında, hemen hemen bütün bu darboğazlar yaşanmıştır.

Türkiye kalkınmakta olan bir ülke olarak, ithal mallarına daima muhtaçtır. Hele her çeşit endüstri alanları için, çeşitli üretim araçları ile ilgili ağır makine ve saireyi ithal etmek zorundadır. Bunların ve diğer zorunlu ithal mallarının yüksek fiyatlarla ithali, ister istemez iç fiyatları yükseltecektir. Esasında devalüasyon uygulamaları olmasa bile Türkiyede, fiyatlar çoğu alanlardaki toplam arz kıtlığı ve diğer ekonomik ve psikolojik nedenlerle yükselmektedir. Bu nedenlerle uygulanması zorunlu hale gelen devalüasyonlarla, ne kadar önlemler alınırsa alınsın, fiyatların yükselmesi önlenemiyecektir. Fiyatların yükselmesi yanında, uygulanan devalüasyonlarla, elinde dövizi bulunanlar, menkul ve gayri menkul sahipleri bir kat daha zenginleşmekte, bunların yanında sabit gelirli, dar gelirli vatandaşlarımız, iyice fakirleşmektedirler.

Türkiyede yabancı kuruluşlar, kâr transferlerini yeni devalüasyon kurlarından yaparak büyük Kârlar elde etmektedirler. Yine Türkiyede yatırım yapacak yabancı sermayedarlar yeni yeni devalüasyon kurları üzerinden, üretim araçları ve nakit yatırımlarını yapacaklarından, avantajları ve kar marjları çok büyük olacaktır.

Bunların yanında, başarılı bir devalüasyonun, ihracatı çoğaltma, ödemeler bilançosundaki açığı kapatma, döviz girdileri artırma, turizmde büyük bir patlama ile turizm gelirlerini çoğaltma, iç fiyatları yeterince istikrarlı tutma, Türk Parasını yine yeterince istikrara kavuşturma gibi faydalar sağlıyabilmesi, yukarılarda belirtilen olumsuz sonuçların etkisini, çoğu zaman önemli sektörlerde ülke ekonomisi lehinde sonuçlandırabilecektir.

1980 yılından günümüze kadar ekonomisi güçlü dünya ülkelerinin milli paraları karşısında, serbest döviz piyasası kuralları gereği para politikası uygulamamız, TL. değerini günümüze kadar sadece heryıl değil, hemen hemen her ay kaybetmiştir. Çünkü TL. karşısında serbest olarak rekabet eden kalkınmış ülkelerin güçlü milli paraları, bu ülkelerin kalkınmış olmalarının simgeleridir. Bu ülkelerde ödemeler bilançosu genel olarak sürekli bir şekilde açık vermemektedir. Sürekli olarak döviz

girdileri yüksek, genel olarak da ithal girdileri ihraç girdilerinin altında kalmaktadır. Türkiye ekonomisi ise bunun tamamen tersidir. Ödemeler bilançosu sürekli olarak açık vermektedir. İthal girdileri, ihraç girdileri yanında sürekli olarak fazlalık vermektedir. Ülke , zaman zaman hyperenflasyon baskısı altında kalmıştır. Milli paraları güçlü kalkınmış ülkelerde enflasyon oranı yok denecek kadar düşükken, ülkemizde bazı yıllar %100'ün üzerinde seyretmiştir. Yine bu ülkelerde ihraç girdileri ithal girdilerinin üstünde olduğu için, döviz girdileri yeterli olup ödemeler bilançoları açık vermemekte, bu nedenle de devalüasyon uygulamalarına gerek görmemektedirler.

Serbest kur politikasına girdiğimiz 1980'den günümüze kadar TL.'nin serbest kur piyasasında sürekli değer kaybetmesine pekçok iktisatçılarımız, serbest kur piyasası uygulanması nedeni ile TL.'nin değer kaybetmesini, devam edegelen devalüasyon olarak kabul etmektedirler. Çünkü yüksek oranlarda sık sık devalüasyon yapılarak TL. değerinin düşürülmesine, TL.'nin zaten devamlı değer kaybetmesi yanında gerek görmemektedirler.

Kısaca özetlediğimiz bu nedenler karşısında, sürekli olarak dar boğaz içinde mücadele veren Türkiye ekonomisinin simgesi olan TL., ekonomik darboğazlara çok seyrek giren kalkınmış ülkelerin simgesi olan milli paraları ile serbest döviz kuru rekabeti ortamında, mücadelede yenik düşmektedir. Bu yenik düşüş, Türkiye ödemeler bilançosu denk hale gelinceye kadar hatta Türkiye ekonomisi güçlü hale gelinceye kadar özfinansman kaynaklarımızla tüm harcamalarımızı finanse edinceye kadar, yıllık döviz girdimiz sürekli artıncaya kadar devam edecektir.

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MEROMORPHIC FUNCTIONS

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ABSTRACT: In this paper, we have given the applications of homogeneous differential polynomials to the Nevanlinna's theory of meromorphic functions in the finite complex plane and given some generalizations by these polynomials.

Key words: *Meromorphic function, homogeneous differential polynomial and finite complex plane.*

ÖZET: Bu çalışmada, homojen diferansiyel polinomlar Nevanlinna kuramına uygulandı ve bu homojen polinomlarla bazı genelleştirmeler verildi.

Anahtar kelimeler: *Meromorfik fonksiyon, homojen diferansiyel polinom ve sonlu karmaşık düzlem.*

1. INTRODUCTION

In this work, we are going to use the usual notations of the Nevanlinna theory of meromorphic functions as explained in (Hayman,1968,1-20), (Nevanlinna,1974,10-25) and (Wittich, 1968, 5-30) such as m(r,f), N(r,f), m(r,a), $\overline{N}$r,a), T(r,f), $\delta(a, f) = \delta(a)$, $\overline{\delta}(a)$ and $\Delta(a)$. By a meromorphic function we shall always mean that a function is meromorphic in the finite complex plane.

If f is a non-constant meromorphic function we shall denote by S(r,f) any quantity satisfying S(r,f)=o[T(r,f)] as $r \to \infty$ through all values if f is of finite order and $r \to \infty$ possibly outside a set of finite linear measure if f is of infinite order. Also, we shall always denote a(z), $a_0(z)$, $a_1(z)$, $a_2(z)$, etc. meromorphic functions satisfying

$$T[r, a(z)] = S(r, f) \text{ and } T[r, a_i(z)] = S(r, f).$$

We shall be concerned with meromorphic functions P which are polynomials in the meromorphic function f and the derivatives of f with coefficients of the form a(z).

Let

$$F_k = a(f)^{t_0}[f^{(1)}]^{t_1}[f^{(2)}]^{t_2} \ldots [f^{(m)}]^{t_m}$$

and

$$P = \sum_{k=1}^{N} F_k$$

where $f^{(1)}$, $f^{(2)}$..., $f^{(m)}$ are the successive derivatives of f and $t_0, t_1, \ldots, t_m$ are non-negative integers.

Definition 1. If $t_0 + t_1, + \ldots, + t_m$ for a fixed positive integer in every term of P, then Pis called a homogeneous differential polynomial in f of degree n.

2. LEMMAS

Lemma 1. If P is a homogeneous differential polynomial in f of degree $n \geq 1$, then we have

$$m\left(r, \frac{P}{f^n}\right) = S(r,f)$$

(Gopalakrishna, 1973, 330).

Lemma 2. Let P be a homogeneous differential polynomial in f of degree n and suppose that P does not involve f. That is, P is a homogenous polynomial of degree n in $f^{(1)}$, $f^{(2)}$,..., $f^{(m)}$ with coefficients of the form a(z) satisfying T[r,a(z)] = S(r,f).

If P is not a constant and a_1, a_2,…,a_q are distinct elements of C where q is any positive integer, then we have

$$n\sum_{i=1}^{q} m\left(r,\frac{1}{f-a_i}\right) \le T(r,P) - N\left(r,\frac{1}{P}\right) + S(r,f) \qquad (1)$$

or

$$nqT(r,f) \le T(r,P) + n\sum_{i=1}^{q} N\left(r,\frac{1}{f-a_i}\right) - N\left(r,\frac{1}{P}\right) + S(r,f) \qquad (2)$$

(Gopalakrishna, 1973, 329-335).

3. THEOREMS

Theorem 1. Let P be a homogeneous differential polynomial in f of degree n and $a \neq b$. If f is a non-constant meromorphic function in the finite complex plane, then we have the following inequality

$$T(r,f) \le N(r,P) + N\left(r,\frac{1}{f-a}\right) + N\left(r,\frac{1}{f-b}\right) - N(r,f) - N\left(r,\frac{1}{P}\right) + S(r,f).$$

Proof. Since $a \neq b$ we can write

$$\frac{1}{f-b} = \left(\frac{P}{f-b} - \frac{P}{f-a}\right)\left(\frac{f-a}{P}\right)\frac{1}{b-a}.$$

If we take absolute values, positive logarithms and mean values of the both sides of this equality we have

$$,\frac{1}{f-b}\right) \le m\left(r,\frac{P}{f-b}\right) + m\left(r,\frac{P}{f-a}\right) + m\left(r,\frac{f-a}{P}\right) + O(1)$$

$$\le m\left(r,\frac{P}{f-b}\right) + m\left(r,\frac{P}{f-a}\right) + m\left(r,\frac{P}{f-a}\right) + N\left(r,\frac{P}{f-a}\right)$$

$$- N\left(r,\frac{f-a}{P}\right) + O(1)$$

$$\le N(r,P) + N\left(r,\frac{1}{f-a}\right) - N\left(r,\frac{1}{P}\right) - N(r,f) + S(r,f) \qquad (3)$$

where

$$m\left(r,\frac{P}{f-a}\right) + m\left(r,\frac{P}{f-b}\right) = S(r,f)$$

and

$$\frac{}{-a}\right) - N\left(r,\frac{f-a}{P}\right) = N(r,P) + N\left(r,\frac{1}{f-a}\right) - N\left(r,\frac{1}{P}\right) - N(r,f).$$

If we add the term $N\left(r,\frac{1}{f-b}\right)$ on both sides of the inequality (3), we get

$$T(r,f) \le N(r,P) + N\left(r,\frac{1}{f-a}\right) + N\left(r,\frac{1}{f-b}\right) - N(r,f) - N\left(r,\frac{1}{P}\right) + S(r,f). \qquad (4)$$

If we restrict $P = f'(z)$, the inequality (4) becomes

$$T(r,f) \le \overline{N}(r,f) + N\left(r,\frac{1}{f-a}\right) + N\left(r,\frac{1}{f-b}\right) - N\left(r,\frac{1}{f'}\right) + S(r,f)$$

which is one of the Nevanlinna's results.

Theorem 2. Let P be a homogeneous differential polynomial in f of degree n and $b \neq 0$. If f is a non-constant meromorphic function in the finite complex plane, we have the following inequality

$$T(r,f) \le \overline{N}(r,f) + N\left(r,\frac{1}{f-a}\right) + \overline{N}\left(r,\frac{1}{P-b}\right) - N_o\left(r,\frac{1}{P'}\right) + S(r,f). \qquad (5)$$

Proof. Since $b \neq 0$ we can write

$$\frac{1}{f-a} = \left(\frac{P}{f-a} - \frac{P'}{f-a}\frac{P-b}{P'}\right)\frac{1}{b}.$$

The mean values of this equality give

$$\begin{aligned} m\left(r,\frac{1}{f-a}\right) &\le m\left(r,\frac{P}{f-a}\right) + m\left(r,\frac{P'}{f-a}\right) + m\left(r,\frac{P-b}{P'}\right) + O(1) \\ &\le N\left(r,\frac{P'}{P-b}\right) - N\left(r,\frac{P-b}{P'}\right) + S(r,f) \\ &\le N(r,P') + N\left(r,\frac{1}{P-b}\right) - N\left(r,\frac{1}{P'}\right) - N(r,P) + S(r,f) \\ &\le \overline{N}(r,P') + N\left(r,\frac{1}{P-b}\right) - N\left(r,\frac{1}{P'}\right) + S(r,f) \\ &\le \overline{N}(r,f) + \overline{N}\left(r,\frac{1}{P-b}\right) - N_o\left(r,\frac{1}{P'}\right) + S(r,f) \end{aligned}$$

or

$$T(r,f) \le \overline{N}(r,f) + N\left(r,\frac{1}{f-a}\right) + \overline{N}\left(r,\frac{1}{P-b}\right) - N_o\left(r,\frac{1}{P'}\right) + S(r,f). \qquad (6)$$

If we restrict $P = f^{(k)}(z)$, the inequality (6) becomes

$$T(r,f) \le \overline{N}(r,f) + N\left(r,\frac{1}{f-a}\right) + \overline{N}\left(r,\frac{1}{f^{(k)}-b}\right) - N_o\left(r,\frac{1}{f^{(k+1)}}\right) + S(r,f)$$

which is the one of Milloux's results (Dönmez, 1979, 203-207).

Theorem 3. Let P be a homogeneous differential polynomial in f of degree n. If f is a non-constant meromorphic function in the finite complex plane, we have

$$T(r,f) \le N\left(r,\frac{1}{f-a}\right)+N\left(r,\frac{1}{P-b}\right)+N\left(r,\frac{1}{P-c}\right)-N_1(r,P)+S(r,f) \qquad (7)$$

where

$$N_1(r,P) = 2N(r,P)-N(r,P')+N\left(r,\frac{1}{P'}\right)$$

and non-negative.

Proof. It is easy to write

$$\frac{1}{f-a}=\frac{1}{P}\frac{P}{f-a}.$$

The mean values of this equality give

$$\begin{aligned} m\left(r,\frac{1}{f-a}\right) &\le m\left(r,\frac{1}{P}\right)+m\left(r,\frac{P}{f-a}\right) \\ &\le m\left(r,\frac{1}{P}\right)+S(r,f) \\ &\le T(r,P)-N\left(r,\frac{1}{P}\right)+S(r,f). \end{aligned} \qquad (8)$$

We know that Nevanlinna's second fundamental theorem is the following in terms of P

$$T(r,P) \le N\left(r,\frac{1}{P}\right)+N\left(r,\frac{1}{P-b}\right)+N\left(r,\frac{1}{P-c}\right)-N_1(r,P)+S(r,P).$$

If we use the second fundamental theorem in the inequality (8), we can write

$$;f) \le N\left(r,\frac{1}{f-a}\right)+N\left(r,\frac{1}{P}\right)+N\left(r,\frac{1}{P-b}\right)+N\left(r,\frac{1}{P-c}\right)-N\left(r,\frac{1}{P}\right)-N_1(r,P)+S(r,f)$$

or

$$T(r,f) \le N\left(r,\frac{1}{f-a}\right)+N\left(r,\frac{1}{P-b}\right)+N\left(r,\frac{1}{P-c}\right)-N_1(r,P)+S(r,f).$$

If we restrict $P = f^{(k)}(z)$, the inequality (7) becomes

$$T(r,f) \le N\left(r,\frac{1}{f-a}\right)+N\left(r,\frac{1}{f^{(k)}-b}\right)+N\left(r,\frac{1}{f^{(k)}-c}\right)-N_1(r,f^{(k)})+S(r,f)$$

which is the one of Hiong's results (Dönmez, 1979, 203-207).

Theorem 4. If P is a homogeneous differential polynomial in f of degree n, then we have

$$nqT(r,f) \le \overline{N}(r,f) + \overline{N}\left(r,\frac{1}{P-b}\right) + n\sum_{i=1}^{q} N\left(r,\frac{1}{f-a_i}\right) - N_o\left(r,\frac{1}{P'}\right) + S(r,f). \quad (9)$$

Proof. The Nevanlinna's second fundamental theorem can be written in terms of the homogenous differential polynomial P as the following,

$$T(r,P) \le \overline{N}(r,P) + N\left(r,\frac{1}{P}\right) + \overline{N}\left(r,\frac{1}{P-b}\right) - N_o\left(r,\frac{1}{P'}\right) + S(r,P).$$

On the other hand, it is easy to write $\overline{N}(r,P) \le \overline{N}(r,f) + S(r,f)$. If we use the inequality (2), we can write

$$nqT(r,f) \le \overline{N}(r,P) + N\left(r,\frac{1}{P}\right) + \overline{N}\left(r,\frac{1}{P-b}\right) - N_o\left(r,\frac{1}{P'}\right) + S(r,f) + n\sum_{i=1}^{q} N\left(r,\frac{1}{f-a_i}\right) - N\left(r,\frac{1}{P}\right) + S(r,f)$$

or

$$nqT(r,f) \le \overline{N}(r,f) + \overline{N}\left(r,\frac{1}{P-b}\right) + n\sum_{i=1}^{q} N\left(r,\frac{1}{f-a_i}\right) - N_o\left(r,\frac{1}{P'}\right) + S(r,f).$$

If n = 1 and q = 1 the inequality (9) gives the inequality (5). That is, the inequality (9) is the generalization of the inequality (5).

Theorem 5. If P is a homogeneous differential polynomial in f of degree n and s = 2,3,4,... then

$$(s-1)nqT(r,f) \le \overline{N}(r,f) + (s-1)n\sum_{i=1}^{q} N\left(r,\frac{1}{f-a_i}\right) + \sum_{j=1}^{s} N\left(r,\frac{1}{P-b_j}\right) - N_o\left(r,\frac{1}{P'}\right) + S(r,f). \quad (10)$$

If s = 3,4,5,... then we have

$$(s-2)nqT(r,f) \le (s-2)n\sum_{i=1}^{q} \overline{N}\left(r,\frac{1}{f-a_i}\right) + \sum_{j=1}^{s} \overline{N}\left(r,\frac{1}{P-b_j}\right) - N_o\left(r,\frac{1}{P'}\right) + S(r,f). \quad (11)$$

Proof. The Nevanlinna's second fundamental theorem can be written in terms of the homogeneous differential polynomial P as the following

$$(s-1)T(r,P) \le \overline{N}(r,f) + \sum_{j=1}^{s} \overline{N}\left(r,\frac{1}{P-b_j}\right) - N_o\left(r,\frac{1}{P'}\right) + S(r,f) \quad (12)$$

and

$$(s-2)T(r,P) \le \sum_{j=1}^{s} \overline{N}\left(r,\frac{1}{P-b_j}\right) - N_1(r,P) + S(r,P) \quad (13)$$

where $N_1(r,P) = 2N(r,P) - N(r,P') + N\left(r,\frac{1}{P'}\right)$ and non-negative. If we use the inequalities (12) and (13) in the equality (10), we obtain the inequality (11).

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WOMEN MATHEMATICIANS

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ABSTRACT: In any book on the history of mathematics, mention about women mathematicians is hardly found. One wonders if there were any and, if any, why so few? The lives of some women mathematicians from different countries, the first who was born in 370 AD and the last who died in 1935. If there were only a few women mathematicians before the 20th Century, why have there been more in the 21th century what has been done, and what is being done, to increase their number?

There is no enough space in this paper to examine the details of the mathematical research being conducted by these eight women. Instead the main interest will be the difficulties involved and the struggles they underwent while fulfilling their desire to become mathematicians, the first one of them who had a tragic end.

Keywords: *Women mathematicians.*

ÖZET: Herhangi bir matematik tarihi kitabında kadın matematikçilere az rastlanılır. İnsan bunun neden bu kadar az olduğunu merak eder. Bu soruya yanıt verebilmek için bilinenlerin bazılarının yaşam öykülerinin bilinmesi gerekir. Bu yazının ilk kısmı farklı ülkelerin kadın matematikçilerine ayrılmıştır. Bunlardan ilki 370 yılında doğmuş ve sonuncusu da 1935 yılında ölmüştür. Bunlarla ilgili bazı sorular vardır. Yirminci yüzyıldan önce çok az kadın matematikçi varsa yirminci yüzyılda daha fazla olması için ne yapılabilirdi? 2001 yılları için ne tahmin yapılabilir?

Kadın matematikçilerin matematikte neler yaptıklarını burada anlatacak kadar yer yoktur. Çok güçlükler çeken bu kadın matematikçilerin ilki Hypatia'dır.

Anahtar sözcükler: Kadın matematikçiler.

HYPATIA (370 - 415)

Hypatia was a typical representative of Alexandrian Neopolitanism. She was the Greek philosopher of the famous 5th Century AD, and perhaps the most famous woman philosopher in history. She was the daughter of Theon of Alexandria, a mathematics writer from whom she seems to have derived and become interested in the subject.

Theon of Alexandria flourished in about 370 AD. He was not actually a mathematician of any important of special note, but mathematical science is indebted to him for an edition of Euclid's Elements and a commentary on the Almagest. This book, translated with comments by M. Halma and published in Paris in 1821, submits a great deal of miscellaneous information about the numerical methods used by the GREEKS.

Hypatia was more distinguished than her father and was the last Alexandrian mathematician of any general reputation. She wrote a commentary on the Conics of Apollonius and possibly other works, but none of her works have survived.

The fate of Hypatia may serve to remind that the Eastern Christians, as soon as they became the dominant party in the state, showed themselves bitterly hostile to all forms of learning. That very singleness of the purpose, which had at first so materially aided their progress developed into a one-sidedness, which refused to see any good outside their own body; and all who did not actively assist them were ultimately persecuted. She was the first woman who took any noteworthy position in mathematics, and perhaps because of her martyrdom she has occupied an unduly exalted place in history. But was this also the end of Alexandrian mathematics?

She was a student of her father, and as such were her attainments that she was called upon, so the tradition says, to preside over the neoplatonic School at Alexandria. Much that passes for history in her case seems to be fiction, as the statement of Suidas (10th century AD) that she married Isidorus of Gaza, the Neoplatonist. It seems certain, however, that she was slain in one of the city brawls between followers of rival sects. Suidas says that she wrote a commentary on an astronomical table of a certain Diophantus, possibly the algebraist, and one on the Conics of Apollonius. Her works, however, are all lost today. For the romantic side of her life, J. Toland wrote, in 1720, " …the history of a most beautiful, most virtuous, most learned… lady ".

Renowned for beauty, modesty, learning and eloquence, she became probably the most important figure in the Neoplatonic School of Alexandria, where she was said to support Orestes, the pagan prefect of Egypt, in his political opposition to St. Cyril, patriarch of Alexandria. She is said to have occupied the Chair of Platonic Philosophy and to have lectured on Plato, Aristotle and other philosophers. Her most notable student was Synesius of Cyrene, who became Bishop of Plotemais in 411 AD and whose affectionate and admiring letters to her are the main source of

information about her personality. This close friendship between the pagan Neoplatonist teacher and the Christian Neoplatonist student illustrates on aspect of the complex relationship between the Christians and pagan at Alexandria under the Christian Roman Empire, the close and fruitful contact, which was so important for later development of Christianity with Pagan philosophy.

Scandalous stories about her friendship with Orestes, as well as disapproval of her non-Christian beliefs eventually caused her tragic end. One day, in March 415 AD, a Christian mob in Alexandria, incited by fanatical clergy, stopped her carriage, dragged her into the church of the Caesarium, flayed her skin by using seashells, tore her limbs apart and burned her broken body in the street.

The impact of her dramatic death in Alexandria has caused that year to be taken by some to mark the end of ancient mathematics, let alone Alexandrian mathematics. As the death of Hypatia had marked the closure of Alexandria as a mathematical center, the final establishment of Christianity in the East marks the end of the Greek scientific schools.

GABRIELLE EMLIE LE TOLELLIER DE BRETEUIL MARQUISE DU CHATELET (1706 – 1749)

The world does not often connect the name of Voltaire (1694 – 1778) with mathematics, and when it connects that of the Marquise de Chatelet with the science, it is largely by courtesy. Each, however, did something to make the Newtonian theory, and each absorbed enough mathematics to make the labor fairly serious.

Francois Marie Arouet, known to the world as Voltaire who was born in Paris, November 21, 1694; died in Paris, May 30, 1778, and as the foremost leader of the 18th century in the contest for human liberty, was interested in mathematics chiefly because he was interested in all things English, was interested in Newton, was interested in getting out a work on Newton's philosophy which was "Éléments de la philosophie de Newton, Amsterdam, 1738", and was interested in Emilie, Marquise du Chatelet.

Marquise du Chatelet, French mathematician, physicist, philosopher, and translator who did much to free French thought from subservience to Cartesianism, was born in Paris on December 17, 1706, the daughter of Luis Nicholas le Tonnelier, baron de Breteuil. An accomplished linguist and musician, she became prominent in the social life of the time. She was married at nineteen to the general marquise Florent du Chatelet-Lemont in 1725, and became a marquise. Then she was a favorite woman and the first woman of the court of the Queen (1725). They had three children; but before and after her marriage she had alliances with other men, the most important being that with Voltaire, dating from 1733. She left her husband her place in the palace and went to Voltaire's habitation (1733) with Voltaire whom she was engaged because of her ambition for scientific matters and philosophy. She became Voltaire's mistress, and provided him with the protection he need when his

"Letters philosophiques" published in 1734, incurred the wrath of the authorities. She continued her scientific studies during this 15-year engagement with Voltaire. She gave him a reliable and a continuous support.

Daughter of the Baron de Breteuil, Marquise du Chatelet, turned her brilliant mind to Euclid, to Newton, to the literary classics of Greece and Rome, to Locke, and to Voltaire. She had had studies about mathematics under Maupertuis and Koenig, read Newton, and understood him, at least in part, and in due time translated the last principia, completing it a few days before her death. It was published posthumously at Paris in 1759. There is a bibliography of her works in A. Rebiere, Les femmes dans la science, 2nd ed., p. 65, Paris 1897. Her most important work was her translation of Newton's Principia, which appeared first in 1756. Influenced by Samuel Koenig, she wrote "Institutions de physique" (1740), a work pervaded by the views of Leibniz. But she was only an amateur in science. Voltaire, in one his many epigrams about her, wrote:

"Her spirit is very philosophical,
But her heart loves pompons."

In French:

"Son esprit est trés philosophe,
Mais son coeur aime les pompons."

In his work on Newton he addresses a poem to her, beginning:

"Tu m'appelles à toi, vaste and puissant Génie,
Minerve de la France, immartal Emilie,
Disciple de Newton, and de la Vérite."

In English:

"You call me to you, great and powerful genius,
Minerve of France, immortal Emilie,
Disciple of Newton and of Truth."

The long so-journs at the château of the Du Chatelets in Champagne provided a haven for writing, as well as refuge from the Paris police whenever it became necessary for her to extricate the intemperate Voltaire from personal and political difficulties.

Marquise de Chatelet and Voltaire in 1738 competed independently for a prize offered by the Academy of Sciences in Paris. Although it failed to win the prize, the academy published it in 1744. A very famous mathematician Leonhard Euler won the prize. Her work was "Dissertation sur la nature et la propagation du feu".

Voltaire and Madame de Chatelet (or du Chatelet-Lomont) continued to live together even after she had transferred her affections to the poet Jean Francois de Saint-Lambert; and when, on September 10, 1749, she died in childbirth in Luneville, at the palace of King Stanislas of Poland, in the presence of her husband and Voltaire

and the poet Jean François de Saint-Lambert, who was the father of her child. These men and her husband were with her.

She had worked until the end on the translation of the Principia, and this was published, with a preface by Voltaire and under the direction of A.C. Clairaunt, in 1756. Frederick, the Great, who loved an epigram far more than he loved the courtesies of life, suggested this epitaph: " Here lies one who lost her life in given birth to an unfortunate child and to a treatise on philosophy."

The many hundreds of letters that passed between Madame du Chatelet and Voltaire are assumed to have been destroyed; but others were included in Voltaire's "Correspondence" edited by Theondore Besterman, 24 Volumes, 1953-1957.

MARIA GAETANAAGNESI (1718-1799)

Among the women of Italy who have added to the store of the world's knowledge of mathematics the most erudite one of this period was Marie Gaetana Agnesi who was Born at Milan, March 16, 1718; died at Milan, January 9, 1799. She lived at a time when it was acceptable for women in Italy to be educated, contrary to the customs in other European countries. This point is very important, because at that time women and their educations were problems in European countries because in Europe, which was the center of civilization, women excluded the sense of education. It was more suitable for women to sew, to etc. in short to be housewife. If we pay attention we conclude that her family was different from other European families in positive way because her father was a mathematics professor at the University of Bologna.

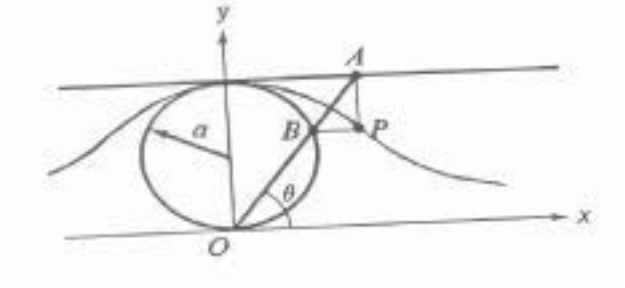
Agnesi was the eldest of 21 children born to a literate family. She was a very precocious child, and her mother and father, latter a professor of mathematics, encouraged her. Marie Agnesi was lucky at this point to born in Italy. She took the advantage of their supply. At the age of nine, at one of the gatherings of intellectuals in her home, she delivered in Latin a discourse defending higher education for women.

Her best-known work, Treatise on Analysis for the Use of Italian Youth, dedicated to the Empress Maria Theresa, was published in two volumes in 1748. Two volumes have four books and they were the first comprehensive calculus texts. In four books, the texts treated algebra and geometry, differential calculus, integral calculus, and differential equations. The text was translated into French and English. There is an English translation, two volumes, London, 1801, with a brief biography. Her work on analytic geometry is well known. There is a mistranslation that is responsible for our calling Agnesi's bell-shaped curve "the witch" today. This name, in fact, is founded only in texts written in English. Agnesi's own name for the curve was "versiera", from the Latin verb vertere, to turn. The translator, a Cambridge scholar who had learned Italian expressly for the purpose of translating Agnesi's text, probably confused the Latin versiera with the Italian avversiera, "wife of the devil", carefully translating the latter as "the witch".

The witch of Maria Agnesi is a bell-shaped curve that may be constructed as follows: Let C be a circle of radius a having its center at (0,*a*) on the y-axis. The variable line through the origin $\overleftrightarrow{OA}$ intersects the line y = 2*a* in the point A and intersects the circle in the point B. A point P on the witch is now located by taking the intersection of lines through A and B parallel to y-and x-axes, respectively.

a. Find parametric equations of the witch for the set of all points P determined as shown in the following figure. (Hint: Show $\overline{OB}$=2*a* sin θ). Sketch the curve.
b. Also find a cartesian equation for the witch of Maria Agnesi.

It was in the Treatise that she discussed the cubic curve, $(x^2 + a^2)y = a^3$ which became know as the Witch of Agnesi due to a misunderstanding. Today many students who study analytical geometry know at least the name Agnesi.
She had been tutoring her younger brothers and sisters, and this work was written



for them, but others soon discovered it and it was translated into many languages and used as a textbook. This is remarkable that she was doing her best while tutoring. She took her job, her responsibilities seriously. She had collected much of the then known work on plane curves, the calculus, and differential equations for these volumes. Because she had a mastery of many languages, including Latin, Greek and Hebrew. She had been able to read the papers in which research on these subjects was reported.

Her work was sufficiently well known in France that a committee of the 1 French Academy of Sciences was appointed to assess it. One member wrote to her, as quoted by Mary R. Beard On Understanding Woman:

I do not know of any work of this kind that is clearer, more methodical or more comprehensive...There is none in mathematical sciences. I admire particularly the art with which you bring under uniform methods the diverse conclusions scattered among the works of geometers reached by methods entirely different.

Although members of the French Academy thought highly of her work, had they wanted to invite her join the Academy they could not have done so, for membership in the Academy was denied to women. There is a question among historians as to whether Agnesi ever held a chair at the University of Bologna, but it is clear that

after her father's death in 1752 she devoted herself completely to religion and to aiding the poor. May be this was a way of escaping from the real world which could not understand the value of her. May be she tried to find the happiness in the world of the poor. If she could have continued to work mathematics we would have more knowledge of course.

SOPHIE GERMAIN (1776-1831)

While Marie Agnesi was still alive, another woman, Sophie Germain (1776-1831) destined also to be a mathematician, was born in Paris. She was not fortunate as Agnesi in her choice of parents and her country, because of the education. Her parents were prosperous, and could have allowed her to study whatever field she wished. They did indeed encourage her in intellectual pursuits until she chose mathematics. That was too much for a girl to choose this subject. For them, girls were like flowers. When they discover that she was secretly studying mathematics in her own room at night, they took away her candles, her fire, and her clothes, leaving her only her bedcovers. They wanted to take away their kid from this disease, because they were egoist. They did not care of her honor and could not think the result. They insulted her and were full of hatred in the deep part of her heart. She wanted to prove herself. She was not only their daughter but she was Sophie Germain. She managed to secrete candles in her room and, after the other members of the family were asleep, she continued her study of mathematics. In the meantime she taught herself Latin so that she could read some of the mathematics books she had obtained. After finding her cold and asleep at her desk many times, her family gave in and allowed her to study mathematics. Now the world was hers and she was very happy. She was working very hard.

It was just at this time that the École Polytechnique was founded, and Germain looked forward to studying mathematics there only to learn that women were excluded from attending the Polytechnique. However, lecture notes were available to all who asked, and Germain obtained these. Students were also allowed to submit written observations, which Germain did under an assumed name, M. LeBlanc. In this way communication between her and the well-known mathematicians of the day was started. In fact, J.L. Lagrange, who was at the École Polytechnique, was so impressed with "his" work that he insisted on meeting "him". When Lagrange discovered that M. LeBlanc was a woman his respect for her work continued. Through Lagrange, Germain got to know all the French scientists of the day, and her home soon became a center for meetings of some of the most distinguished of the group.

In the years 1804 and 1805, Gauss had some correspondence about number-theoretic problems with a then unknown French mathematician. We quote twice from the correspondence with Olbers, First from a letter of December 7, 1804:

"Recently I had the pleasure to receive a letter from LeBlanc, a young geometer in Paris, who made himself enthusiastically familiar with higher mathematics and showed how deeply he penetrated into my Disquisitiones Aritmeticae..."

The second quotation is more than two years later, March 24, 1807:

"Recently, I was greatly surprised on account of my Disquisitiones Aritmeticae. Did I not repeatedly write you of a correspondence in Paris, one M. LeBlanc, who had perfectly understood all my investigations? This LeBlanc recently explained himself to me. You will certainly be as surprised as I was when you hear that LeBlanc is the assumed name of a young woman, Sophie Germain".

One of the later proofs of the law of quadratic reciprocity is connected to an idea of Sophie Germain; her name is remembered in number theory because she was the first to find the solution for certain special cases of Fermat's last theorem. That a solution to the equation $x^n + y^n = z^n$ is impossible in positive integers for any integer n greater than 2. L.E. Dickson used her work on this problem in 1908 to prove Fermat's last theorem for every odd prime n less than 1700. In 1910, E. Dubois named a special type of prime number as a Sophien, thus ensuring that Sophie Germain's name lives on in the theory of numbers, too. By now she was known under her own name and had begun to publish the results of her research, which were in many different fields. She also worked on curvature of surfaces, and was even a philosopher; after her death, a nephew collected her writings in philosophy and publish them under the title "Considerations generale sur l'etat des sciences et des letters aux differentes epoques de leur culture".

Having disposed of quadratic second-degree reciprocity, it was natural for Gauss to consider the general question of binomial congruences of any degree. If m is a given integer not divisible by the prime p, and if n is a given positive integer, and if further an integer x can be founded such that $x^n \equiv m \pmod{p}$, m is called an n-ic residue of p; when n=4, m is a biquatratic residue of p.

The case of quadratic binomial congruences (n=2) suggests but little to do when exceeds 2. One of the matters Gauss was to have included in the discarded eighth section, (as he told Sophie Germain, in the projected but unachieved second volume) of the Disquisitiones Aritmeticae was a discussion of these higher congruences and a search for the corresponding laws of reciprocity, namely the interconnections (as to solvability or non-solvability) of the pair $x^n \equiv p \pmod{q}$, $x^n \equiv q \pmod{p}$, where p, q are rational primes. In particular cases n=3, n=4 were to have been investigated.

That Gauss was not merely being polite to a young woman admirer is shown by a letter of July 21, 1807 to his friend Olbers. "... Lagrange is warmly interested in astronomy and the higher arithmetic; the two test-theorems (for what primes 2 is a cubic or a biquadratic residue), which I also communicated to him some time ago, he consider among the most beautiful things and the most difficult to prove. But Sophie Germain has sent me the proofs of these; I have not yet been able to go through them, but I believe they are good; at least she had attacked the matter from the right side, only somewhat more diffusely than would be necessary..." The theorems to which Gauss refers are those stating for what odd primes p each of the congruences $x^3 \equiv 2 \pmod{p}$, $x^4 \equiv 2 \pmod{p}$ is solvable.

The lady in question was Mademoiselle Sophie Germain just a year than Gauss. She and Gauss never met. Gauss recommended to the faculty of the University of Göttingen that she be awarded an honorary doctor's degree, but unfortunately, she died of cancer, in 1831, before it could be conferred. By a curious coincidence we shall see the most celebrated woman mathematician of the nineteenth century, another Sophie, getting her degree from the same liberal University many later after Berlin had refused her on account of her sex.

In 1809, Napoleon ordered the Academy of Sciences to after a prize for a solution to the problem of finding a mathematical theory for elastic surface and comparing it with experimental data. Twice, anonymously, Germain submitted solutions. The first time her entry was the only one submitted. Each time a mistake was found and no prize was awarded. The third time she submitted an entry using her real name and won, despite a lock of rigor due to lack of formal training. Her equation for elastic laminae is still the fundamental equation of the theory and now known as Germain's equation. She had won prestigious prize without having published a single paper. Sophie Germain's scientific interests embraced acoustics, the mathematical theory of elasticity, and the higher arithmetic, in all of which she did notable work.

Entranced by the Disquisitiones Arithmeticae, Sophie wrote to Gauss some of her own arithmetical observations. Fearing that Gauss might be prejudiced against a women mathematician, she assumed a man's name. Gauss formed a high opinion of the talented correspondent whom he addressed in excellent French as "Mr. LeBlanc ".

Germain never held a post at academic institution. The story of her correspondence with the famous mathematician C.F. Gauss is well known. A mathematician friend recommended to her Gauss's Disquisitiones Arithmeticae (published in 1801), although at that time not many mathematicians had been able to penetrate deeply into the work. Germain was greatly interested in it and in 1804 wrote her first letter to Gauss, including some problems in number theory on which she was working at the time. She again used the assumed name of M. LeBlanc; later by accident, Gauss learned that LeBlanc was a woman, but, to his credit, their correspondence continued. Over a four-year period they exchanged many letters concerning mathematical questions.

LeBlanc dropped her-or his- disguise when she was forced to divulge her true name to Gauss on the occasion of her having done him a good turn with the French infesting Hanover. Writing on April 30, 1807, Gauss thanks his correspondent for her intervention on his behalf with the French General Pernety and deplores the war. Continuing, he pays her a high compliment and expresses something of his own love for the theory of numbers. As the latter is particularly of interest we shall quote from this letter, which shows Gauss in one of his cordially human moods.

"But how describe to you my admiration and astonishment at seeing my esteemed correspondent Mr. LeBlanc metamorphose himself into this illustrious personage (Sophie Germain) who gives such a brilliant example of what I would find it

difficult to believe. A taste for the abstract sciences in general and above all the mysteries of numbers is excessively rare: one is not astonished at it; the enchanting charms of this sublime science reveal themselves only to those who have the courage to go deeply into it. But when a person of the sex, which according to our customs and prejudices, must encounter infinitely more difficulties than men to familiarize herself with these thorny researches, succeeds nevertheless in surmounting these obstacles and penetrating the most obscure parts of them, then without doubt she must have the noblest courage, quite extraordinary talents and a superior genius. Indeed nothing could prove to me in so flattering and less equivocal manner that the attractions of this science, which has enriched my life with so many joys, are not chimerical, as the predilection with which you have honored it." He then goes on to discuss mathematics with her. A delightful touch is the date at the end of the letter: "Bronsvic ce 30 Avril 1807 jour de ma naissance-Brunswick, this 30th of April 1807, my birthday."

A completely different experience was connected with a war tax levied by the French government in 1808. Gauss, who was subjected to it as a member of the university, was asked to pay ffrs 2000, a very considerable sum for a man who had just joined the university and not yet received his first salary. Without being asked, Lagrange in Paris and Olbers in Bremen offered their help, but Gauss did not want to accept any money from them. In the end, the contribution was paid by an anonymous donor who, somewhat surprisingly, turned out to be Count Dahlberg, formerly the arch-chancellor of the Roman Empire and then Lord Bishop of Frankfurt. There were other signs of his growing fame. In 1810, only two years later, Gauss won a medal from the Institut de France. He refused the money that accompanied it, but accepted the astronomical clock that was purchase for him by Sophie Germain.

If Gauss was somewhat cool in his printed expressions of appreciation he was cordial enough in his correspondence and in his scientific relations with those who sought him out in a spirit of disinterested inquiry. One of his scientific friendships is of more than mathematical interest as it shows the liberality of Gauss' views regarding women scientific workers. His broadmindedness in this respect would have been remarkable for any man of his generation; for a German it was almost without precedent.

What a pity that she had no choice to continue for living.

MARY FAIRFAX SOMERVILLE (1780-1872)

Four years later the birth of Sophie Germain in France, Mary Fairfax Somerville (1780-1872) was born in Scotland. She grew up in a small seacoast village and received no formal education until after she was ten years old, when her father sent her to a fashionable girls' school. She hated the school and returned home after a year. She was not interested in elementary subjects, around, friends, teacher and books. They were very dull for her. It was her first school. At school she seems to

have inspired a curious mixture of fear and anger in minds of her teachers and fellow students. Her teachers were good men and patient, but it was merely a strong word to describe the heinous inability of a mathematical genius of the first rank to squander her intellect on the futilities of rhetoric as expounded. Some madness dominates this girl. She lost for one year there. But at least she could now read, and read she did, despite the complaints of relatives who saw that she was reading instead of sewing.

It was by accident that she saw a problem in magazine that was solved by algebra, and she wondered what this algebra. She thought days and days about what algebra was! This question that was seen by chance by her would make her to penetrate the world of mathematics. At the end she wanted to buy a book on algebra, but it was not acceptable at that time for a young girl to go into a bookstore and by such a book instead of buying earrings, rings, and skirts. Why? Perhaps, if they entered the world of mathematics, they would have learned to use their sense and they would never have let men to use of them in any case.

One day she heard of Euclid's Elements of Geometry when her painting teacher recommended it to male student, saying it would help him with perspective. Once more she could not obtain a copy because of her sex. Which was important, sexuality or brain? Again, by accident, she was sewing in the room where a brother was being tutored in mathematics and, when he could not answer a question asked by the tutor, she prompted him. The tutor became sympathetic to her desire to learn mathematics, obtained a copy of Euclid for her, and helped her as much as he could. Her mother was horrified at her daughter's desire to study mathematics and, naturally, instructed the servants to take away her candles so that she could not study at night. Her father predicted that she would soon be in a straitjacket. Today, we must thank this tutor who helped her. Again thanks coincidences, which made her entering the world of mathematics. But she continued to study mathematics by herself.

It was only after second marriage to a cousin, William Somerville, a surgeon, that she found someone sympathetic to her desire for knowledge. There were now sufficient funds to allow her to follow her interests, but there were also four children. She managed somehow to find time to work. When the family moved to London, her husband's work brought them into contact with intellectuals. In this way she met the scientists of the day, among them the Herschels (Caroline, Sir William, Sir John), Sir Edward Parry, Lord Brougham and P.S. de LaPlace. Soon she was one of them.

Soon after she presented her first paper, "The Magnetic Properties of the Violet Rays of the Solar Spectrum," to the Royal Society in 1826. In 1827 she was invited (by letter to her husband, asking him to persuade her) by Society for the Diffusion of Useful Knowledge to write a popularization of LaPlace's Mécanique Céleste. She accepted the invitation and translated the text, adding her own extensive notes. She called the work The Mechanisms of the Heavens. It was her most popular work, but she also wrote The Connection of the Physical Sciences, 1858; Molecular and

Microscopic Sciences, 1869; Physical Geography, 1870, as well as many articles and monographs including "On Curves and Surfaces of Higher Order". The question of Euclid's fifth postulate relating to parallel lines, has occupied the attention of geometers ever since Elements was written. The first scientific investigation of this part of the foundation of geometry was made by Girolamo Sacchery (1733) that Somerville has read this of course.

Somerville took the view that mathematical truths existed in the mind of the Deity and that humans could only discover them, not create them. However, she was not so theological in her outlook that she escaped the criticism of the Church. Dean Cockburn of York Cathedral denounced her by name from his pulpit, for her support of science.

All her life Somerville was an advocate of education for women and in her later years she wrote "Age has not abated my zeal for the emancipation of my sex from the unreasonable prejudice to prevalent in Great Britain against a literary and scientific education for women".

In 1879, seven years after her death, Somerville College was founded at Oxford University as a women's college, which it still is today. In the last few years when three of the five women's colleges at Oxford have become coeducational, the Somerville College faculty has voted to keep the faculty, as well as the student body, all female.

CHRISTINE LADD FRANKLIN (1848-1930)

One might have hoped that opportunities for women mathematicians were better in the New World, but unfortunately they were not. Christine Ladd Franklin (1848-1930), an 1869 graduate of Vassar College, wanted to be a physicist. She later learned that women were not allowed to work in laboratories and changed her interest to mathematics. When Johns Hopkins University founded in 1876, announced a fellowship program in mathematics, her application submitted under the name C. Ladd, was one of the first to arrive. Her credentials proved to be so outstanding that she was awarded a fellowship, sight unseen.

When the Board of Trustees discover that she was a woman, they accused her of using trickery in order to gain admission and her fellowship was revoked. Fortunately this occurred while the world-famous English mathematician, James J. Sylvester was at Hopkins. He had read some of her papers in English mathematical journals and insisted that the gifted young woman be admitted. The Trustees gave in, and Ladd entered Johns Hopkins in 1878 on a three-year fellowship. However, the Trustees forbade that her name appear in print in any list of fellowship holders at Johns Hopkins. In 1882 she submitted her dissertation, "The Algebra of Logic", which her adviser, Charles Sanders Peirce, said was brilliant. That was not good enough for the Trustees however, and they ruled that no Ph.D. should be granted to her on the grounds that a precedent might be set.

Soon after this the Franklins left Johns Hopkins and went to Göttingen to study. There they found that women were not allowed to attend lectures. However, a member of the Göttingen faculty was so impressed with Ladd Franklin's abilities that he gave his lectures to her privately and let her work in his laboratory. Out of this period came the beginning of her work on color vision, now known as the Ladd Franklin theory. In 1904 she and her husband returned to Baltimore, he as editor of a Baltimore newspaper and she as a lecturer in logic and psychology at Johns Hopkins, the only woman member of the faculty. (Apparently, lecturers could be appointed without permission of the Trustees). Still the Trustees refused to grant her the Ph.D. degree. In 1909 when Columbia University invited her to join its psychology faculty, she accepted.

It was while she was at Columbia that a member of the Psychology Department at Harvard University invited her to give a lecture there. She had accepted, and he had made all arrangements for her talk, which was to be followed by a dinner in her honor, when Harvard's President heard of it. He immediately wrote to the psychologist who had invited her, saying that no woman was to speak at Harvard and that he must withdraw the invitation. She replied that, unless she heard directly from the President of Harvard, she was coming anyway. It seems that the President did not write, and Ladd Franklin came to Harvard. Plans for her talk and visit went off as originally scheduled.

Finally, 44 years after Christine Ladd Franklin had completed all the work for the Ph.D., and when she was 78 years old, Johns Hopkins awarded her the degree.

SONJA (1850-1891)

In Russia in the 1800's encouragement for women to become mathematicians was not any greater than it had been in France in the 1700's. Sonja Corvin-Kurkovsky Kovalevsky was born at Moscow, Russia, on January 15, 1850, and died at Stockholm, Sweden, on February 10, 1891, six years before the death of Weierstrass. She was the daughter of an artillery officer in the Russian army. In her teens she developed intellectual interests and was particularly fond of Algebra. Her father's concept of a woman did not include her being an intellectual. When her father learned that she liked algebra, he immediately threw away her algebra book. However, she was able to obtain another and continued her study secretly. Both she and her sister wanted university educations, but at that time in Russia women were not admitted to the universities. They determined to go abroad, but this was not possible as long as they needed the permission of their parents.

At fifteen Sonja began the study of mathematics. By eighteen she had made such rapid progress the she was ready for advanced work and was enamored of the subject. As she came of an aristocratic and prosperous family, she was enabled to gratify her ambition for foreign study and matriculated at the University of Heidelberg. With the aid of intellectual friends of their own age in St. Petersburg, they arranged a fictitious marriage for Sonja, when she was 18, with Vladimir

Kovalevsky. The three sets out for Heidelberg, the couple acting as chaperone for the other sister.

However, in Heidelberg the story was the same; women were not admitted to the University. This highly gifted girl became not only the leading woman mathematician of modern times, but also made a reputation as a leader in the movement for the emancipation of women, particularly as regarded their age-old disabilities in the field of higher education. After much effort on her part she was allowed to audit lectures. It was at this time that she decided that she definitely wanted to become a mathematician.

In addition to all this she was a brilliant writer. As a young girl she hesitated long between mathematics and literature as a career. After the composition of her most important mathematical work (the prize memoir noted later), she turned to literature as a relaxation and wrote the reminiscences of her childhood in Russia in the form of a novel (publish first in Swedish and Danish). Of this work it is reported "the literary critics of Russia and Scandinavia were unanimous in declaring that Sonja Kovalevsky had equaled the best writers of Russian literature in style and thought." Unfortunately this promising start was blocked by her premature death, and only fragments of other literary works survive. Her one novel was translated into many languages.

We must first tell how Sonja and Weierstrass met. Weierstrass used to enjoy his summer vacation in a thoroughly human manner. The Franco-Prussian war caused him to forego his usual summer trip in 1870, and he stayed in Berlin, lecturing on elliptic functions. Owing to the war his class had dwindled to only twenty instead of the fifty who heard the lectures two years before.

Since the autumn of 1869 Sonja Kowalewski; then a dazzling young woman of nineteen, had been studying elliptic functions under Leo Königsberger (born 1837) at the University of Heidelberg, where she had also followed the lectures on physics by Kirchhoff and Helmholtz and had met Bunsen, the famous chemist under rather amusing circumstance to be related presently. Königsberger, one of Weierstrass first pupils, was a first-rate publicity agent for his master. Sonja caught her teacher's enthusiasm and resolved to go directly to the master himself for inspiration and enlightenment She wanted to work with Karl W.T. Weierstrass at the University of Berlin. So she went to Berlin, only to learn that opportunities there were even worse for women than in Heidelberg; women were not even allowed to audit classes. She wrote to Weierstrass and asked him to let her study with him as a private pupil. He sent her some problems to solve and was so impressed with her solutions that he consented to let her study with him.

The years (1864-97) of Weierstrass' career at Berlin as Professor of Mathematics were full of scientific and human interests for the man who was acknowledged as the leading analyst in the world. One phase of these interests demands more than the passing reference that might suffice in a purely scientific biography of Weierstrass:

his friendship with his favorite pupil, Sonja Kowalewski. Although Weierstrass never married but he was no panicky bachelor who took to his heels every time he saw a pretty woman coming. Sonja, according to competent judges who knew her, was extremely good looking, charming and a very beautiful girl.

The status of unmarried women students in the 1870's was somewhat anomalous. To forestall gossip, Sonja at the age of eighteen contracted what was to have been a nominal marriage, left her husband in Russia, and set out for Germany. Her one indiscretion in her dealings with Weierstrass was her neglect to inform him at the beginning that she was married.

Having decided to learn from the master himself, Sonja took her courage in her hands and called on Weierstrass in Berlin. She was twenty, very earnest, very eager, and very determined; he was fifty five, vividly grateful for the lift Gudermann had given him toward becoming a mathematician by taking him on as a pupil, and sympathetically understanding of the ambitions of young people. To hide her trepidation Sonja wore a large and floppy hat, "so that Weierstrass saw nothing of those marvelous eyes whose eloquence, when she wished it none could resist".

Sonja's evident earnestness on her first visit impressed Weierstrass favorably and he wrote to Königsberger inquiring about her mathematical aptitudes. He asked also whether "the lady's personality offers the necessary guarantees". On receiving an enthusiastic reply, Weierstrass tried to get the university senate to admit Sonja to his mathematical lectures. Being brusquely refused he took care of her himself on his own time. Every Sunday afternoon was devoted to teaching Sonja at his house, and once a week Weierstrass returned her visit. After the first few lessons Sonja lost her hat and Weierstrass saw her beautiful eyes immediately. The lessons began in autumn of 1870 and continued with slight interruptions due to vacations or illnesses till the autumn of 1874. He soon came to consider her to be one of his most promising students. For four years she worked very hard with his teacher.

In 1874 she finished three articles, anyone of which, according to Weierstrass, was suitable for a Ph.D. dissertation. The question obviously was where she might receive a Ph.D. degree since it would be hard to receive a degree from the University of Berlin at which she had been denied admission. Weierstrass approached Göttingen, which had in the past awarded degrees in absentia. Finally, after many objections by Göttingen and efforts by Weierstrass, Göttingen awarded her the degree. In the one of her three articles, which was used as a dissertation, she solved a problem in partial differential equations posed by Cauchy. Her solution is now known as the Cauchy-Kovalevsky Theorem.

After taking her degree in absentia from Göttingen in 1874, Sonja returned to Russia for a rest as she was worn, out by excitement and overwork. Her fame had preceded her and she "rested" by plunging into the hectic utilities of a crowded social season in St. Petersburg.

There followed a six-year period in which she did no mathematics; for reasons that are unknown, she returned to Russia where it was impossible for her to teach. She and her husband turned their fictitious marriage into a real one; she developed and followed other interest; she did not answer Weierstrass' letters. There were financial problems; her marriage deteriorated. When Weierstrass came back in Berlin, pulled wires all over Europe trying to get his favorite pupil a position worthy of her talents. His fruitless efforts disgusted him with the narrowness of the orthodox academic mind.

In October 1875, Weierstrass received from Sonja the news that her father had died. In August 1878, he writes to ask whether she ever received a letter he had written her so long before that he has forgotten its date. Sonja now demonstrated what a woman could do in that line when she puts her mind to it. She did not answer her old friend's letter for two years although she knew he had been unhappy and in poor health.

The answer when it did come was rather a letdown. Sonja's sex had got the better of her ambitions and she had been living happily with her husband. In October 1878, Sonja's daughter "Foufie" was born. The forced quiet after Foufie's arrival roused the mother's dormant mathematical interests once more, and she wrote to Weierstrass for technical advice. He replied that he must look up the relevant literature before venturing an opinion.

After three years later she decided to return to mathematics and asked Weierstrass for advice. She soon tired of domesticity, and when P.S. Tchebyscheff invited her to give a paper at the Sixth Congress of Natural Scientists in 1880, she accepted, giving one of the three papers she had written in Berlin. Gösta Mittag-Leffler heard her talk at this Congress, and offered to try to get her a position at the University of Helsinki where he was on the faculty. She decided against this, but did go abroad and began to work on mathematics again, sometimes in Paris, sometimes in Berlin and sometimes in Moscow. She left her daughter with a friend in Berlin.

Sonja's domestic difficulties presently resolved themselves through the sudden death of her husband in March 1883 by suicide, Mittap-Leffler wrote Weierstrass that he had convinced the administration at Stockholm University, where he now was a professor, to allow Kovalevsky to lecture there, unpaid, of course. Finally, in 1884, the University offered her a five-year professorship.

She began working on a problem for which the French Academy of Sciences had offered a prize of 3000 Francs, the Bordin Prize. The problem was that of determining the path of rotation of a solid body around a fixed point, where the path is contained in an ellipsoidal shell. The solutions were judged without knowledge of the identity of the authors. She received the prize, her solution having being so worthy that the prize money was increased to 5000 francs.

In the meantime she became emotionally involved with a Russian philosopher who was living in France. He proposed marriage on the condition that she gives up her

work. She refused. In 1889, at the end of her five-year professorship at Stockholm University, she was made professor for life; in today's parlance, she received tenure. On return from one of her visits to her philosopher friend, she contracted influenza and died in Stockholm at the age of 41 and at the height of her mathematical powers. Shortly before, she had been elected to the St. Petersburg Academy of Sciences.

EMMY NOETHER (1882-1935)

In the year in which Ladd Franklin should have received her Ph.D., Emmy Noether (1882-1935) was born in Germany. Her father was the mathematician Max Noether a professor at the University of Erlangen. Until she was 18 she seems to have followed the usual pattern for daughters of the bourgeoisie in Erlangen; she attended the state Girls' School, learned English and French, and took the Bavarian state examinations for certification as a teacher of those languages, should she ever need to earn her livelihood. She had first mathematics education from her father. It was soon after this that she decided she wanted to attend the University and to study mathematics. There are apparently no records left which might show why this young woman suddenly wanted to change the routine of her life and become a mathematician. At that time women were allowed to audit courses at the universities, providing they received permission from the professors. On this basis Noether audited courses at the University of Erlangen from 1900 to 1902. However, she wanted to enroll at the University as a regular student, which was, in general, not allowed. In fact, at that time women could not attend the Gymnasium, which prepared male students for admission to the universities. But there was a loophole. Students could take a matriculation examination for admission to the university without having attended the Gymnasium. Noether took and passed this examination. Finally, she was permitted to enroll at Erlangen and in July 1908 she was awarded her degree.

Emmy Noether had little in common with the legendary "female mathematician" Sonja Kowalewski, who had bewitched even Weierstrass with her young charms as well as her mind. Noether was not even feminine in her appearance or manner. This is the first thing even today, that the men who knew her recall. "She had a loud and disagreeable voice, she looked like an energetic and very nearsighted washerwoman. Her clothes were always baggy". And they still quote with delight the gentle remark of Hemann Weyl that "the groces did not preside at her cradle." But she was to be much more important to mathematics than the bewitching Sonja. Even at this time, she had an impressive knowledge of certain subjects which Hilbert and Klein needed for their work on relativity theory, and they were both determined that she must stay in Göttingen. But in spite of the fact that Göttingen had been the first university in Germany to grand a doctoral degree to a woman, it was still not an easy matter to obtain habilitation for one. The entire Philosophical Faculty, which included philosophers, philologists and historians as well as natural scientists and mathematicians, had to vote on the acceptance of the habilitation thesis. Particular opposition came from the non-mathematical members of the Faculty.

They argued formally: "How can it be allowed that a woman become a privatdozent? Having become a privatdozent, she can then become a professor and a member of the University Senate. Is it permitted that a woman enter the Senate?" They argued informally, "What will our soldiers think when they return to the University and find that they are expected to learn at the feet of a woman?"

Hilbert had heard what to him were similarly irrelevant arguments when he had been attempting to have Gromme's dissertation approved by the same faculty members. "If students without the gymnasium diploma will always write such dissertations as Grommer's," he had told them, "it will be necessary to make a law forbidding the taking of the examination for the diploma." Now he answered their formal argument against habilitating Emmy Noether with equal directness:

"Meine Herren, I do not see that the sex of the candidate is an argument against her admission as a Privatdozent. After all, the Senate is not a bath-house".

When, in spite of this rejoinder, he still could not obtain her habilitation, he solved the problem of keeping her at Göttingen in his own way. Lectures would be announced under the name of Professor Hilbert, but delivered by Fräulein Noether. She was delivering the lectures in Hilbert's name and with his support because, since she was a woman, she had not been permitted to become a Privatdozent.

Noether's Ph.D. dissertation, "On complete systems of invariants for ternary biquadratic forms," was written under the direction of Paul Gordan. From 1908 until 1915 she stayed in Erlangen, without a position, doing research in mathematics, giving invited lectures, publishing papers and toward the end of his life, substituting for her father at the University when he was ill. During this time she was beginning to be recognized as a mathematician of the rank. In 1915 Felix Klein and David Hilbert invited her to come to Göttingen, which she did, staying until 1933 when she was forced to leave by the Nazis. Klein and Hilbert were particularly interested in her work on invariant theory for its usefulness in general relativity theory, on which they were working at the time. Yet however liberal Göttingen may have been in 1915 when compared to other German universities, it was still not ready for a woman faculty member. Despite the efforts of Hilbert and Klein, she was not granted a position which carried any stipend until 1923 when she was given a Lectureship in Algebra with a minimal stipend.

In the years between 1915 and 1923, she lectured at Göttingen, not under her own name, but under Hilbert's name. In her first year at Göttingen her research continued in invariant theory, resulting in two papers on differential invariants, which are still used today. Noether's axiomatic approach to the study of abstract rings and ideal theory, for which she is best known, first appeared in a paper, written jointly with W. Schmeidler, in 1920. P.S. Alexandroff, the Russian mathematician, in his address to the Moscow Mathematical Society in 1935 at the time of her death said: Emmy Noether entered upon her wholly individual path of mathematical work in 1919-1920… This work with W. Schmeidler serves as a prologue to her general theory of

ideals, opening with the classical memoir of 1921, "Idealtheorie in Ringbereichen." I think that of all that Emmy Noether did, the bases of the general theory of ideals and all the work related to them have exerted, and will continue to exert, the greatest influence on mathematics as a whole... She taught us just to think in simple, and thus general, terms-homomorphic representation, the group or ring with operators, the ideal- and not in complicated algebraic calculations, and she therefore opened a path to the discovery of algebraic regularities where before these regularities had been obscured by complicated specific conditions.

In her work Noether stressed the use of chain conditions. It is because of her work that rings with the ascending chain condition on ideals are now known as Noetherian rings.

To quote Alexandroff again: From 1927 the influence of the ideas of Emmy Noether on contemporary mathematics continually grew, and along with it grew scientific praise for the author of those ideas. The direction of her work at this time moved more and more into the region of noncommutative algebra, the theory of representation and of the general arithmetic of hypercomplex areas...

Emmy Noether at last received recognition for her ideas. If in the years 1923-1925 she had to demonstrate the importance of the theories that she had developed, in 1932, at the International Mathematical Congress in Zürich. She was crowned with the laurel of her success. A summary of her work read by her at this gathering was the triumph of the direction she represented...

It is interesting to note that both Noether and Germain did their most significant work relatively late for a mathematician.

According to Hermann Weyl, who became a member of the Göttingen faculty in 1930, Noether was "the strongest center of mathematics activity" at Göttingen from 1930 to 1933, "considering both the fertility of her scientific research program and her influence upon a large circle of pupils." Many of her younger colleagues, among them Weyl, recognized the injustice done to her in her lack of a suitable position, and tried to get a better position for her. In 1935 Weyl wrote: When I was called permanently to Göttingen in 1930, I earnestly tried to obtain from the Ministerium a better position for her, because I was ashamed to occupy such a preferred position beside her whom I knew to be my superior as a mathematician in many respects. I did not succeed. Tradition, prejudice, external considerations, weighted the balance against her scientific merits and scientific greatness, by that time denied by no one.

Emmy Noether was not a full professor, but she contributed importantly to the mathematical atmosphere of Göttingen during this period. She and her students, few in number and many of them foreign, represented the trend toward abstraction and generalization which was to become more and more dominant in mathematics during the coming years.

She was a very poor lecturer, writing on the board and wiping almost immediately what she had written. She spoke quickly and sometimes condensed many syllables into one or two. To Friedrichs it seemed that her speaking never quite caught up with her thinking. "I have no doubt she had a very clear understanding of what she was saying," Hans Lewy said, "but she did not have a clear idea of what she was going to say." She was devoted to her students, who come to her with a11 their problems, personal as well as mathematical. She was especially popular with the Russian visitors; and when they began to go around Göttingen in their shirtsleeves-a startling departure from proper dress for students- the style was christened the Noether- guard uniform.

The leading woman mathematician of our own times, Emmy Noether also came from Göttingen. The word "came from" is right. When the sagacious Nazis expelled Fräulein Noether from Germany because she was a Jewess, Bryn Mawr College, Pennsylvania, took her in. She was the most creative abstract algebraist in the world. In less than a week of the new German enlightenment, Göttingen lost the liberality which Gauss cherished and which he strove all his life to maintain.

One of the most fertile circles of research in post-war Göttingen revolved around Emmy Noether. The desired position of Privatdozent had at last been obtained for her in 1919. This was still the lowest possible rank on the university scale, not a job but a privilege. But Emmy Noether was delighted with the appointment. In the thirteen years that had passed, she had had to defend her doctoral dissertation before Gordan; she had come a long way. Already she had achieved important results in differential invariants, which the Soviet mathematician Paul Alexandroff was to consider sufficient to secure her a reputation as a first-rate mathematician, "hardly less a contribution to mathematical science than the notable researches of Sonja." She herself was always to dismiss these works as standing to the side of her main scientific path, on which at last she was now at the age of 39, taking her first step, the building up on an axiomatic basis of a completely general theory of ideals. This work would have it source in the early algebraic work of Hilbert, but in her hands the axiomatic method would become no longer "merely a method for logical clarification and deepening of the foundations as it was with Hilbert, but a powerful weapon of concrete mathematical research."

In 1922 she became an associate professor. There were no obligations connected with this now title and no salary, such an extraordinary professor being consider more than usual inferior to an ordinary professor. Only a Göttingen saying to the effect "an extraordinary professor knows nothing ordinary and an ordinary professor knows nothing extraordinary" could explain the title.

She and her work were not on the whole much admired in her native land. She was never even elected to the Göttingen Scientific Society. "It is time that we begin to elect some people of real stature to this society," Hilbert once remarked at a meeting "Now, how many people of stature have we indeed elected in the past few years?" He looked thoughtfully around at the members. "Only zero," he said at last. "Only zero!"

I said she was not a good lecturer and her classes usually numbered no more than five or ten. Once though, she arrived at the appointed hour to find more than a hundred students waiting for her. "You must have the wrong class," she told them. But they began the traditional noisy shuffling of the feet, which, in lieu of clapping, preceded and ended each university class. So she went ahead and delivered her lecture to this unusually large number of students. When she finished, a note was passed up to her by one of her regular students who were in the group. "The visitors," it read, "have understood the lecture just as well as any of the regular students."

It was true she had no pedagogical talents. Her mind was open only to those who were in sympathy with it. Her teaching approach, like her thinking, was wholly conceptual. But of all the new generation in Göttingen, Emmy Noether was to have the greatest influence on the course of mathematics.

1933 with the Nazis in power in Germany, Noether, a Jew, was dismissed from her post at Göttingen. Alexandroff attempt to get her an appointment at the University of Moscow, but Russian red tape was slow and, when Bryn Mawr offered her a one-year visiting appointment she accepted it. From Bryn Mawr it was an easy trip to the Institute for Advanced Study and she soon began to give weekly lectures. At the age of 51 this remarkable mathematician held her first position at what might be called a "normal" salary. It is to the great credit of Anna Pell Wheeler, Chairman of the Mathematics Department at Bryn Mawr College at the time, and to the College itself, that Noether was invited to this country. In the second year at Bryn Mawr she entered the hospital for a routine operation to remove a tumor. She seemed to be recovering well, when suddenly she died, still at the bight of her mathematical powers.

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PARAMETRELERİ DEĞİŞKEN DC SER VOMOTOR İÇİN PI TİPİ PARAMETRİK ANLAMDA DAYANIKLI DENETLEYİCİ TASARIMI

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ÖZET: Arzu edilen bir denetim sistemi performansı elde edebilmek için öncelikle denetlenecek olan sistemin parametrelerinin kesin olarak belirlenmesi gerekir. Fakat yapısal ve yapısal olmayan belirsizlikler sonucu göz önüne alınan sistem modeli belli sınırlar içerisinde değişiklikler gösterebilir. Bu makalede model üzerindeki değişiklikleri de göz önüne alarak, sanayide sıkça kullanılan DC servomotorlar için PI tipi hız denetleyicisi, belli bir performansı her çalışma şartında sağlayacak şekilde tasarlanmıştır. Tasarım safhasında Ackermann ve Kaesbauer sınır tasvir teoreminin sonuçlarından yararlanılmıştır.

Anahtar kelimeler: *Dayanıklı denetim (kontrol), dc servomotor, PI denetim*

ABSTRACT: In order to obtain a desired control system performance, primarily, the parameters of the system to be controlled must be determined. However, due to the structural and non-structural uncertainties, the system model considered could exhibit some variations within the boundaries. In this paper, taking the parameter variations on the model into account, a PI type speed controller for dc servomotors, which are commonly used in the industry, was designed to provide a specified performance under all the working conditions. During the design phase, the results obtained from Ackermann and Kausbauer boundary representation theory were used.

Keywords: *Robust control, dc servomotor, PI control*

1. GİRİŞ

Klasik kontrol teorisinde, bir denetleyici tasarımı için sistemin matematiksel modelinin tam olarak bilinmesi esastır. Sistemi tanımlayan modeller, sistem parametrelerinin değişmediği veya çok az değiştiği varsayılarak sistemin nominal çalışma şartlarından çıkartılır. Ancak bazı fiziksel koşullar altında sistem modelinde bulunan parametreler belli aralıklarda değişiklikler arz eder. Bu değişiklikler kontrol sisteminin performansını olumsuz yönde etkileyebilir. Bu olumsuzlukları gidermenin yolu, parametre değişikliklerini denetleyici tasarımında göz önünde bulundurmaktan geçer. Yapılan bu çalışmada öncelikle DC servomotorunun matematiksel modeli elde edilmiştir. Elde edilen motor transfer fonksiyonunun katsayılarının değişim aralıkları belirlendikten sonra seçilen bir *gama kararlılık bölgesi* için oransal ve integral (PI) denetleyicisinin katsayılarının seçimi için tasarım denklemleri sunulmuştur. Bu elde edilen tasarım denklemleri sonucunda kontrolör performansı klasik tasarım yöntemlerine göre daha dayanıklı bir hale gelmiştir. Klasik kontrol teorisinde göz önüne alınan kriter, sistem parametrelerinin değişmeyeceği yönündedir. Ele aldığımız tasarımda ise parametrelerin belli bir aralıkta değişmesine izin verilmektedir. Kontrolör parametrelerinin sunulan yöntemle belirlenmesi sonucunda, parametre değişimi dayanıklılık üzerinde hiçbir olumsuz etki yaratamamaktadır.

2. SERVOMOTOR ve MATEMATİKSELMODELİ

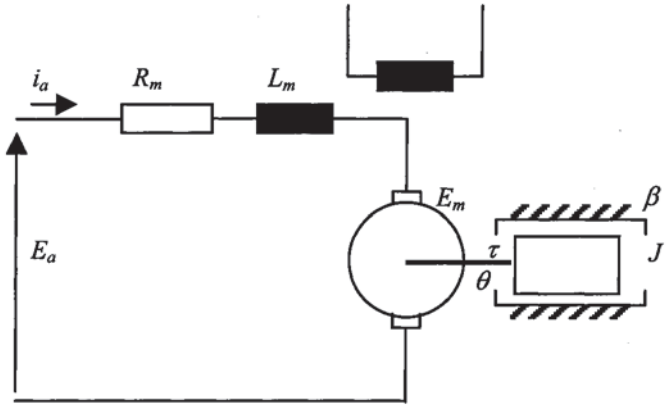
Sanayide kullanılan çeşitli doğru akım motorları vardır. Servo sistemlerde kullanılan doğru akım motorlarına ise *DC servomotorlar* adı verilir. DC servomotorlarda rotor eylemsizlik momenti çok küçüktür. Bu sebepten dolayı piyasada çıkış momentinin eylemsizlik momentine oranı çok büyük olan motorlar bulunur. Bazı DC servomotorların çok küçük zaman sabitleri vardır. Düşük güçlü DC servomotorlar piyasada genellikle bilgisayar kontrollü cihazlarda (disket sürücüler, teyp sürücüleri, yazıcılar, kelime işlemciler, tarayıcılar vs.) kullanılırlar. Orta ve büyük güçlü servomotorlar ise sanayide genellikle robot sistemleri ile sayısal denetimli hassas diş açma tezgahlarında kullanılırlar.

DC servomotorlarda alan sargıları rotor sargılarına seri veya paralel bağlanır. Endüvi sargılarından bağımsız olarak uyartılan alan sargılarının akısı endüvi sargılarından geçen akımın fonksiyonu değildir. Bazı dc servomotorlarda magnetik alan sargısı yerine sabit bir mıknatıs bulunur. Bu tip motorlarda magnetik akı sabittir. Uyarma sargıları endüviden bağımsız olan veya sabit mıknatısla uyartılan motorlarda hız kontrolü endüvi gerilimi ile yapılabilir. Bu tip kontrol yöntemine endüvi kontrol yöntemi denir.

Uyarma sargılarının yarattığı akı ile yapılan denetlemede ise endüvi akımı sabit tutulur. Statorda bulunan uyartım sargılarının yarattığı akının kontrolü ile hız ayarlanır. Bu tip motorlara *alan kontrollü* motorlar denir. Fakat rotor sargılarından geçen akımın sabit tutulabilmesi ciddi bir problemdir. Zira rotor akımı yükün ve kaynağın birer fonksiyonudur. Endüvi kontrollü motorlara göre alan kontrollü

motorların zaman sabitleri daha büyüktür. Büyük aralıklarda değişen hız ayarlarında rotor geriliminin değiştirilmesi; buna karşılık küçük aralıklarda hassas hız ayarı gereken yerlerde ise alan sargılarının yaratmış olduğu magnetik akı ile hız kontrolü yöntemi tercih edilir.

DC servomotorlar genellikle "elektronik hareket denetleyicileri" adı verilen servo sürücüler ile kontrol edilirler. Servo sürücüler servomotorun hareketini kontrol ederler. Kontrol edilen büyüklükler çoğu zaman noktadan noktaya konum kontrolü, hız kontrolü ve ivme programlamasıdır. PWM tekniği adı verilen darbe genişlik modülasyonu genellikle robot kontrol sistemlerinde, sayısal kontrol sistemlerinde, ve diğer konum denetleyicilerinde kullanılırlar. Şekil 2.1'deki servomotor sistemini göz önüne alalım.



Şekil 2.1 DC Servomotorun elektro - mekanik eşdeğer devresi

$$e_a(t) = K\Phi \frac{d\theta}{dt} \tag{1}$$

Burada K motor parametresi, Φ alan akısı, $e_a(t)$ motor uçlarına uygulanan PWM şeklindeki ayar gerilimidir. θ motor mili $e_m(t)$ dönme açısıdır. Akının değişmediğini varsayarsak, $e_b(t)$ ters elektromotor kuvveti;

$$e_b(t) = K_m \frac{d\theta}{dt} \tag{2}$$

elde edilir. (2) ifadesinin Laplace dönüşümü alınırsa;

$$E_b(s)=K_m s\ \theta(s). \tag{3}$$

Armatür devresi için;

$$E_a(s)=(L_a s+R_a).I_a(s)+E_b(s) \tag{4}$$

yazılabilir. Motor milinde endüklenen tork ifadesi ise;

$$\tau(t)=K_1 \Phi I_a(t)=K_\tau i_a(t). \tag{5}$$

şeklindedir. Son olarak mekanik kısım için;

$$J\frac{d^2\theta}{dt^2} = \tau(t) - \beta\frac{d\theta}{dt} \qquad (6)$$

yazılabilir. Burada J motor miline bağlanan yükün eylemsizlik momenti, β sürtünme katsayılarını içermektedir. R_a ve L_a motor eşdeğer devre parametreleri, K_I, K_τ ve K_m motor sabitleridir. Yukarıdaki denklem sisteminin çözümünden

$$G(s) = \frac{\omega(s)}{E_a(s)} = \frac{K_\tau}{JR_a s + (\beta R_a + K_\tau K_m)} \qquad (7)$$

kolaylıkla elde edilebilir. (7) ifadesinde $\omega(s)$ motor milinin açısal hızını ifade etmektedir. Bu ifadeyi parametre kalabalığından uzaklaşmak amacı ile,

$$G(s) = \frac{\frac{K_\tau}{JR_a}}{s + \frac{\beta R_a + K_\tau K_m}{JR_a}} = \frac{K_t}{s+b} \qquad (8)$$

şeklinde kullanacağız. Burada K_t katsayısı $[K_t^-, K_t^+]$ aralığında, b katsayısı ise $[b^-, b^+]$ aralığında değişmektedir. [1]

3. GAMAKARARLI KONTROL SİSTEMİ TASARIMI

Kararlı sistemlerin başarısız referans cevapları, kök yer eğrisi üzerinde seçilen bir Γ bölgesinde sistem kutuplarını hareket ettirmeye zorlayarak giderilebilir. Burada öncelikle Γ 'nın matematiksel modeli göz önüne alınmalıdır:

$\Delta(s)=(s-s_1)(s-s_2)\ldots\ldots(s-s_n)$

şeklinde karakteristik sistem polinomu için,

$\forall\, s_i \in \Gamma_i \;\; i = 1,2,\ldots,n$

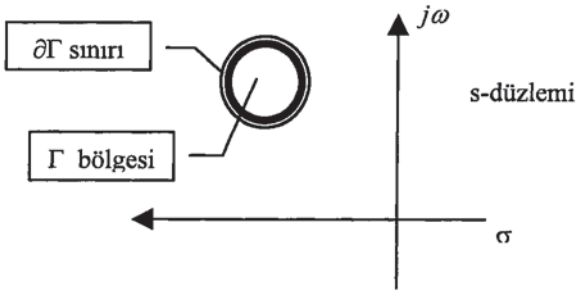
şartını sağlıyorsa bu sistem Γ *kararlıdır*. Γ bölgesinin matematiksel ifadesi geleneksel kararlılık yada sol yarı s-düzleminde bulunma olarak tanımlanırsa,

$\partial\Gamma := \{\, s : s=j\omega \quad 0 \le \omega \le +\infty \,\}$

sınırı şeklinde ifade edilir, Şekil 3.1. Karakteristik denklem polinomları pozitif reel katsayılı olduğundan ω negatif olamaz. Ayrıca kökler bu nedenle reel eksene göre simetriktir. Genelleştirilirse, bir Γ bölgesinin ∂Γ sınırı şu şekilde ifade edilebilir.

$\partial\Gamma := \{\, s : s=\sigma(\alpha)+j\omega(\alpha) \quad \alpha \in [\alpha^-, \alpha^+] \},\ \Gamma \subseteq C$

Burada α^- ve α^+ sınırları $-\infty$ yada $+\infty$ olabilir. α skaler parametresi *genelleştirilmiş frekans* adını alır. [2]



Şekil 3.1 Γ kararlılık bölgesinin gösterimi

Teorem: (Ackermann-Kaesbauer Sınır Tasvir Teoremi)
$P(s,\mathbf{q}) = [1 \;\; s \;\; . \;\; . \;\; . \;\; s^n]\mathbf{a}(q)$ şeklinde bir polinomu göz önüne alalım. Ayrıca, bir interval maksimum kutusunu $Q_{im}(\alpha) := \{q : p(=\sigma(\alpha)+j\omega(\alpha), q) = 0, \alpha \in [\alpha^-, \alpha^+]\}$ şeklinde tanımlayalım. Burada a(q) vektörü, parametreleri belli aralıklarda değişen karakteristik polinomun katsayılarını içermektedir. $q \in Q_{im}(\alpha)$ şartı ancak ve ancak

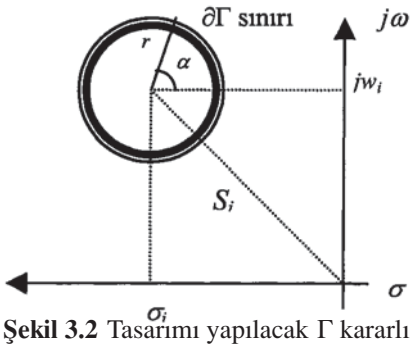
$$\begin{bmatrix} d_0(\alpha) & d_1(\alpha) & . & . & d_n(\alpha) \\ 0 & d_0(\alpha) & . & . & d_{n-1}(\alpha) \end{bmatrix} \mathbf{a}(q) = \begin{bmatrix} 0 \\ 0 \end{bmatrix} \qquad (9)$$

bazı $\alpha \in [\alpha^-, \alpha^+]$ için geçerlidir. Burada,

$$d_0(\alpha) = 1$$
$$d_1(\alpha) = 2\sigma(\alpha)$$
$$\cdot$$
$$\cdot$$
$$d_{i+1}(\alpha) = 2\sigma(\alpha)d_i(\alpha) - (\sigma^2(\alpha) + w^2(\alpha))d_{i-1}(\alpha), \;\; (i = 1,2,..,n-1)$$

□ (10)

olarak tanımlanır. Bu teoremin ispatı [2] ve [3]'te sunulduğundan burada yer verilmeyecektir. Biz problemimizde Şekil 3.2 deki gibi bir Γ kararlı karmaşık bölgesi tanımladık. Dolayısıyla denetleyicimizi, karakteristik denklem kutuplarının bu bölge içerisinde kalmasını sağlayacak şekilde tasarlayacağız.

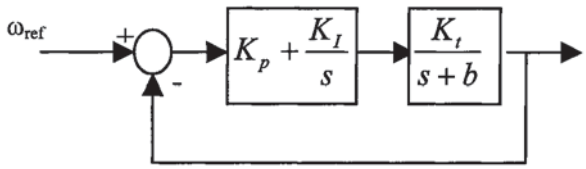


Şekil 3.2 Tasarımı yapılacak Γ kararlı denetleyici için seçilen Γ bölgesi

Şekil 3.2'deki bölge için ∂Γ sınır denklemini yazacak olursak; $S_i = \sigma_i + j\omega_i$ etrafında r yarı çaplı bir daire şeklini alacaktır ve denklemi;

$$S_i = (\sigma_i + r\cos\alpha) + j(\omega_i + r\sin\alpha) \quad (11)$$

yapısındadır. Burada, $\alpha \in [0, 2\pi]$ dir. Kontrol sistemimizi PI denetleyicisi şeklinde seçersek kararlı hal hatasını da gıdermiş olacağız. Denetleyici içeren sistemin blok diyagramı Şekil 3.3'te sunulmuştur, [1].



Şekil 3.3 Motor kontrol sistemi blok diyagramı

Şekil 3.3 deki sistem blok diyagramı için karakteristik polinom;

$$\Delta(s) = s^2 + (b + K_pK_t)s + K_IK_t = 0 \quad (12)$$

burada, $q = \begin{bmatrix} b \\ K_t \end{bmatrix}$ $b \in [b^-, b^+]$ ve $K_t \in [K_t^-, K_t^+]$ şeklindedir. Tasarımı yapılacak denetleyici için yukarıdaki teorem kullanılırsa,

$$d_0(\alpha) = 1$$
$$d_1(\alpha) = 2\sigma(\alpha) = 2(\sigma_i + r\cos\alpha)$$
$$d_2(\alpha) = 3(\sigma_i + r\cos\alpha)^2 + (\omega_i + r\sin\alpha)^2 \quad (13)$$

elde edilir. Bu katsayılar ilgili eşitlikte yerine yazılarak;

$$\begin{bmatrix} 1 & 2(\sigma_i + r\cos\alpha) & 3(\sigma_i + r\cos\alpha)^2 + (\omega_i + r\sin\alpha)^2 \\ 0 & 1 & 2(\sigma_i + r\cos\alpha) \end{bmatrix} \begin{bmatrix} a_0 \\ a_1 \\ 1 \end{bmatrix} = \begin{bmatrix} 0 \\ 0 \end{bmatrix} \quad (14)$$

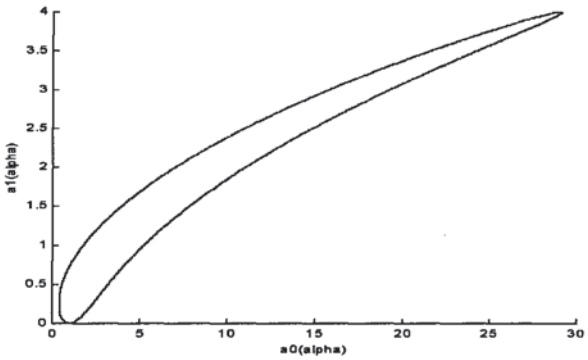
elde edilir. (14) denklemi çözülerek karakteristik polinom katsayıları ile a genelleştirilmiş frekansı arasındaki ilişkiler aşağıdaki gibi elde edilir.

$$a_1 = -2\sigma_i - 2r\cos\alpha \quad (15)$$

$$a_0 = 7(\sigma_i + r\cos\alpha)^2 + (\omega_i + r\sin\alpha)^2 \quad (16)$$

Özellikle $\sigma_i = -1$ ve $\omega_i = 1$ alınırsa, $a_0(\alpha)$ nın $a_1(\alpha)$ ya göre değişimi, Şekil 3.4'teki gibi olur. Burada Γ kararlı bölge kapalı eğrinin içidir. Bu kapalı eğri içersindeki herhangi bir nokta çifti, kapalı çevrim kutuplarını Şekil 3.2'de tanımlamış

olduğumuz kapalı karmaşık bölge içerisinde tutacaktır, [4]. Bu da, sistemin belirsiz katsayıları belli aralıklarda değiştiği sürece arzu edilen performansın sağlanması anlamına gelir. Bu katsayıları Şekil 3.4'te gösterilen kapalı eğri içerisinde tutabilmek için kapalı eğri içersinde bir nokta çifti seçilmelidir. Şöyle ki; (a_{1d} , a_{od}) çiftini seçmiş olalım. Buradan denetleyici katsayıları,



Şekil 3.4 $a_0(\alpha)$'nın $a_1(\alpha)$'ya göre değişimi ve Γ kararlı bölgesi (kapalı eğrinin içi).

$$\frac{a_{1d} - b^+}{K_t^+} \le K_p \le \frac{a_{1d} - b^-}{K_t^-} \tag{17}$$

$$\frac{a_{0d}}{K_t^+} \le K_I \le \frac{a_{0d}}{K_t^-} \tag{18}$$

kapalı aralıkları dahilinde seçilecek olursa sistem, parametreleri belli aralıklarda değişse bile performansından bir şey kaybetmeyecektir.

4. SONUÇ

(17) ve (18) nolu denklemlerle belirlenen aralık içersinde seçilen K_p ve K_I değerleri PI tipi denetleyicinin dayanıklılığını arttırmaktadır. Seçilen kararlı gama bölgesi içine hapsedilen kapalı çevrim sistem kutupları kararlılığın, bozuculardan etkilenmesini engellemektedir.

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ALMANYA'DA ORTABOY İŞLETMELER İÇİN DERECELENDİRME SORUNU

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ÖZET: Bu çalışmada kısaca, Almanya`da ortaboy işletmelerdeki derecelendirme sorunu incelenmiştir. Uluslararası derecelendirme şirketlerinin değerlendirme yöntemleri çoğunlukla ortaboy işletmeler için kullanılamamakta ya da uygun olmamaktadır. Aynı şekilde bu kuruluşların ortaboy işletmelerle ilgili olmayan bir takım kriterlerle yapacakları derecelendirmelerin de kabul görmesi beklenemez.

Almanya`da özellikle ortaboy işletmelerin sermaye gereksinimleri, yeni derecelendirme kuruluşlarının hizmetlerinin gelişmesini teşvik edici bir unsur olarak görülmektedir. Derecelendirme işleminde hedef ortaboy işletmelerdir. Bu işletmelerde sermaye ihtiyacı hem daha fazla hemde bu işletmelerin yönetim ve sermaye arasındaki bağlantıları daha sıkıdır. Aynı zamanda borsaya açılmak isteyen işletmelerde bir derecelendirme ihtiyacı doğmaktadır. Derecelendirmeden ilk olarak işletme ve yönetim yararlanmaktadır. Ayrıca ortaklar, kredi sunanlar, müşteriler v.b. gruplarda bu bilgiden istifa etmektedirler. Derecelendirme konusunda ülkemizde cok fazla bir gelişme söz konusu değildir, çoğunlukla bankalar, uluslararası derecelendirme kuruluşlarıyla çalışmaktadırlar.

Anahtar Kelimeler: *Derecelendirme, Reyting, Uluslararası derecelendirme.*

ABSTRACT: This study examines the rating problems in medium-size companies in Germany. The rating models employed by international rating agencies are in general not applicable for medium-size companies. Therefore, ratings made by international agencies using their conventional criteria would hardly give good results for small and medium size firms.

The capital needs of medium-size companies encourage the development of services of new rating agencies in Germany which consider medium size companies as the targets of their services. The need for external capital is greater and there are stronger ties between management and capital ownership in medium size companies. On the other hand, rating becomes so crucial when they plan to go public. Rating is useful not only for investors, creditors and customers but for management as well. Rating has not yet become a popular concept in Turkey. Those firms - mostly commercial banks- that want to be rated apply to international rating agencies for their services.

Key Words: *Rating, International Rating Agency.*

I. Giriş

İlk derecelendirme kuruluşları 1900 lu yıllarda A.B.D.`de kurulmuştur (Everling, 2000: 673-676). Bu kuruluşların kurulma nedeni A.B.D`de faaliyet gösteren demiryolu şirketlerinin tahvil çıkarma yoluyla yaptıkları borçlanmalarda firmaların finansal durumu hakkında bilgi sağlamaktı. Demiryolu işletmelerinin derecelendirilmesini çok kısa bir zaman sonra endüstri işletmelerinin borçlanma senetleri için derecelendirilmesi izledi. Derecelendirme (reyting), fınans sözlüklerinde, finansal veya kredi değerliliğini belirleme olarak geçmektedir (Doyrangöl, 1996). Reyting kavramı; bond rating (tahvil derecelendirme) ve ticari senet derecelendirmesi (commercial paper rating) olarak ikiye ayrılmaktadir. İşletme derecelendirmesi işletmeyle ilgili tarafların vazgeçemeyeceği, önemli nitelikteki bir bilgidir. Örneğin, sermaye piyasasındaki yatırımcılar bu bilgi ihtiyacı için uluslararası derecelendirme şirketlerinden yararlanmaktadırlar. Uluslararası derecelendirme şirketlerinin değerlendirme metodları çoğunlukla ortaboy işletmeler için kullanılamamakta yada uygun olmamaktadır. Aynı şekilde bu kuruluşların ortaboy işletmelerle ilgili olmayan bir takım kriterlerle yapacakları derecelendirmelerin de kabul görmesi beklenemez. Çoğunlukla kredi veren kuruluşlar kendilerine özgü bir derecelendirme sistemi geliştirmişlerdir. Çoğunlukla da bu kuruluşların derecelendirme yöntemlerinde çeşitli bilanço kalemlerinin karşılaştırılması sonucu bulunan rasyolar kullanılmıstır. Değerlendirmeler yapılarken benzer işletmelerden yada çeşitli banka vb. kurumların istihbarat bilgilerinden istifade edilmektedir. Buradaki ölçümlemeler genellikle işletmenin ödeme davranışlarına dayalıdır. Bu değerlendirmelerin işletmenin genel durumu hakkında yeterli bir bilgi vermesi söz konusu değildir. Almanya da kapsamlı ve objektif derecelendirme işletmeleri cok az sayıdadir ve sadece borsaya kote edilmiş isletmeler için faaliyet göstermektedirler.

Almanya`da ortaboy işletmelerin düşüncelerini bilen ve ulusal çerçeve içinde değerlendirebilecek bağımsız derecelendirme kuruluşlarına ihtiyaç duyulmaktadır (Pape, 1999: 245-246). Almanya'da yeni bir konu olmasına ragmen bu işletmelerin ulusal ekonomi içindeki yerleri açısından derecelendirme önemli bir unsur olarak görülmektedir. Orta boy isletmelerin değerlendirilmesi Almanya açısından önemli görülmektedir. Önemli görülmesinin gerekçelerinden biride şirketleşme, kamuya açılma kültürünün orta boy işletmeler için henüz yeterli olmaması gösterilmektedir.

Bundan sonrakı bölümlerdeki amacımız, derecelendirmenin orta boy işletmeler açısından etkisi ve önemine Almanya açısından yaklaşmak olacaktır.

II. Derecelendirme ve Etkileri

1. Başlangıçtaki Durum

Küçük ve orta boy işletmeler (KOBI), çeşitli yatırım, yeni ürünlerin piyasaya sunulması ve ürün geliştirme gibi konularda fikirlerini gerçekleştirebilmek için

sermayeye ihtiyaç duyarlar. Bu sermaye ihtiyacı için çoğunlukta kullanılan yöntem yabancı kaynak kullanımı şeklinde gerçekleşmektedir.

a) Öz sermaye sorunu

Büyümekte olan yada olmayan bir çok işletmenin , hatta piyasadaki köklü işletmelerin, sermaye yeterliliğinin bankalara kıyasla, yetersiz yada zayıf olduğu bir gerçektir. Örneğin Almanya da bile işletmelerin, şu andaki özsermaye yeterliliğinin, geçmis dönemlere nispeten yetersiz olduğu ifade edilmektedir. Hatta Almanya da özsermaye yeterliliğinin 1970 yıllarda %25 ler düzeyinin üzerindeyken, günümüzde %18 ler düzeyine gerilediği tespit edilmiştir (Pape, 1999: 246-248).

Uygulamada işletmelerin finansman ihtiyaçlarını sadece bankalara yada kredi kuruluşlarına güvenerek sağlamaları imkansızdir. Almanya da hala öz sermaye piyasası yeterince gelişmemiştir. Sermaye piyasasının gelişmişlik düzeyindeki yetersizlikler, küçük ve ortaboy işletmelerin Alman ekonomisi üzerindeki olumlu etkisini ve dünyadaki rekabet gücünü kaybetmesine yol açmaktadır.

b) Sermaye Piyasası ve Finansman

Yabancı kaynak finansmanı özellikle küçük ve gelişmekte olan işletmelerde çok önemlidir. Alman sermaye piyasasında sermaye sunan kesimler aşagıda gösterilmiştir:

- Özel ve kamu kredi kuruluşları
- Ekonominin ihtiyaçları doğrultusunda finansman sağlayan, devlete ve eyaletlere ait kredi kuruluşları
- Hane halkı.
- Yatırım sermayesi kurulusları
- İşletmeler

Yatırımcıların riski çok zor hesaplanan özel işletmelere yatırım yapmaktan kaçındıkları, yada bu yönde bir yatırımdan çekindikleri görülmektedir. Yatırımcı açısından yatırım yapılacak işletmenin riskinin kolayca hesaplanması yatırım tercihinde önem arz etmektedir. Bu sorunun farkına varan Almanya`nın Bayern ve Hessen eyaletlerinin ekonomi bakanları, orta boy işletmeleri kurumsallaşma yönünde teşvik etmişlerdir. Bu amaçla küçük işletmeler için bir yasa çıkartılarak bu işletmelerin sermaye şirketi (Anonim şirket) haline dönüştürülmesine yönelik bir takım kolaylıklar sağlanmıştır. Yapılmak istenen işletmeleri kurumsallaşmaya teşvik ederek, yatırımcılar için cazip hale getirmektir.

c) Risk Sermayesi

Risk sermayesi (venture capital) olarak anılan piyasanın Almanya da diğer gelişmiş ülkelerle kıyaslandığında çok yetersiz bir düzeyde olduğu görülmektedir. Bu piyasada yaklaşık 100 finansman işletmesi 1994 yılında yaklasık 5,5 milyar DM

işlem hacmi gerçekleştirmiştir. Aynı zamanda tahminlere göre bu piyasa senede 1 milyar DM büyüme kapasitesine sahiptir.Diğer gelişmiş ülkelerdeki risk sermayesi işlem hacmine bakıldığında, örnegin ABD`de yaklaşık 55 milyar DM, İngiltere de yaklaşık 50 milyar DM ve Fransa da ise yaklaşık 20 milyar DM düzeyinde olduğu görülmektedir. Bu gelişmiş ülkelerdeki rakamlarla da kıyaslandığında risk sermayesi finansman yönteminin Almanya da çok gerilerde kaldığı açık bir şekilde görülmektedir.

d) Sorunun çözümü

Sermaye sunanlar, yatırım yaptıkları işletmelerin ekonomik durumunu, yapılan yatırımın verimliliğini, ve risk faktörlerini yatırım sırasında gözönünde bulundururlar. Bu nedenle yatırım yapılacak işletmelerle ilgili değerlendirmede, finansal analiz sonuçlarının dışında muhasebe denetimi sonucunda ortaya çıkmış bazı bilgilere de ihtiyaç duyarlar. Bu bilgiler dışında sayısal olmayan yönetim stratejisi, gelecekle ilgili planlar ve organizasyon faktörlerini de içeren şirket reytingi (rating), yatırımcılar için önemli bir bilgidir. Objektif ve tarafsız derecelendirme şirketleri, yatırımcılara karar vermelerinde önemli katkılar saglamaktadırlar.

2. Şirket Derecelendirmesinde Hedef Gruplar

Genelde sektör ya da büyüklük ayrımı yapılmaksızın, tüm işletmeler derecelendirme için potansiyel hedef grubu olabilmektedir. Derecelendirme sonuçları, özellikle kredi kuruluşları için, kredi verilecek yada kredi verilen kuruluşla ilgili, borç ve benzeri iş ilişkisinde, bu kurumlara karar vermede yardımcı olmaktadır. Şimdiye kadar yapılan işletme derecelendirmelerinde, genellikle uluslararası derecelendirme kuruluşları (Moody`s, S&P`s vb.) tarafından ve sadece borsaya kote edilmiş işletmeler için yapılmaktadır. Halbuki büyük bir ihtiyaç ve talep olmasına rağmen orta boy işletmeler için böyle bir derecelendirme yapılmamaktadır. Bu işletmeler için yapılacak derecelendirmeye, bu işletmelere sermaye sunan kurumlar tarafindan şiddetli bir şekilde ihtiyaç duyulmaktadır.

a) Orta Boy İşletmeler

Derecelendirme işleminin ana hedef müşteri grubunu orta boy işletmeler oluşturmaktadır.

b) Derecelendirme İhtiyacı

Orta boy işletmeler hakkında, sistematik başarı ve risk analizi değerlendirmeleri bulunmamaktadır. Bağımsız derecelendirme işletmeleri, objektif , ileriye dönük risk ve başarı değerlendirme ihtiyacını karsılayabileceklerdir. Bu kuruluşların sağladığı analiz ve bilgiler ile işletmelerin göstermiş olduğu ileriye yönelik gelişme sinyalleri vb. tespit edilebilecektir. Ayrıca elde edilen derecelendirme bilgileri ile pazardaki benzer firmalarla kıyaslama yapma imkanı doğabilecek, böylece de kıyaslama

yapılan işletmenin performansı ile ilgili kesin bir bakış açısı oluşturulabilecektir. Örneğin, bazı işletmelerin olumsuzlukları ortaya çıkacağından bu işletmeler bu zaaflarından kurtarılmaya çalışabilecek ve eksikleri düzeltme yoluna gidebilecektir. Aynı zamanda olumsuz finansal yapıya sahip bir firmanın finansal yapısının güçlendirilmesi için gerekli önlemleri almasına yardımcı olabilecektir. İşletmelerin hangi büyüklükte olursa olsun derecelendirmeye ihtiyaç duyduğu açıktır. Özelliklede yukarıda sıralanan nedenlerden ötürü, orta boy işletmeler özellikle, bağımsız derecelendirme işletmelerine ihtiyaç duymaktadır.

c) Almanya'daki Potansiyel

İşletme danışmanlık şirketi Arthur D.Little (Arthur D.Little, 1998), küçük ve orta boy işletmeler için derecelendirme adlı araştırmasında, Almanya'daki küçük ve ortaboy işletmeler için büyük bir bağımsız derecelendirme ihtiyacı olduğu sonucunu elde etmiştir. 1997 yılındaki verilere göre sonuçlar aşağıdaki gibidir:

Araştırmaya katılanların,

- %53`ü bu konuda yapılacak bir derecelendirme için ödeme yapmaya hazır olduğunu,
- %72`si derecelendirme işlemine katılmaya hazır olduğunu,
- %87`si derecelendirmenin KOBİ'ler için yararlı bulduğunu,

belirtmiştir.

Yukarıdaki sonuçlar bu ülkede şirket derecelendirmesine ilginin boyutunu açık bir şekilde göstermektedir. Degişik sermaye gruplarının, KOBİ`lerin derecelendirilmesine yönelik sorulara verdiği yanıtlar ise şu şekildedir:
Bu yanıtlar özellikle bankalar, kamu kuruluşları, ve sermaye kurumları tarfından

Yatırımcı Grubu	***İlgi Düzeyi***	***Neden***
Sigorta Şirketleri	Yüksek	Daha çok dolaylı ilgi söz konusu
Sermaye Yatırım Kurumları	Çok yüksek	Sermayedarlerin gelişimi açısından
Bankalar	Yüksek	Sermaye sunanlarin korunması açısından
Kamu Kurumları	Çok yüksek	Kamu yararı açısından

KOBİ`lerin derecelendirilmesine şiddetle ihtiyaç duyulduğunu ortaya koymaktadır. Yukarıda bahsi geçen araştırma çalışmasında ayrıca oluşturulacak bir derecelendirme kuruluşunun, derecelendirme ile ilgili taşıması gerekli koşullar da tanımlanmıştır. Bu tanımlamalar aşağıda sıralanmıştır:

- Standard bir derecelendirme yönteminin bulunması,
- Derecelendirme kuruluşunun bagımsız olması (özellikle bankalar ve kamu kuruluşlarından bagımsız olması),
- Derecelendirme yönteminin ve tanımlamalarının açık ve anlaşılır olması,
- Yönetim ve piyasa ihtiyaçlarına dayanan denetim ölçütlerinin de sistemin içinde olması,

- Yapılacak çalışmaların, yayın ve reklam yoluyla çabuk olarak piyasaya sunulması
- Ülke genelinde bir derecelendirme standardının oluşturulması.

3. İşletme Derecelendirmesinin Sağladığı Hizmetler

İşletme derecelendirmesi, bağımsız bir derecelendirme kuruluşu tarafından işletmenin geleceğe yönelik başarı ve risk faktörlerinin değerlendirilmesidir.

a) Başarı Faktörleri

İşletme derecelendirmesi ile bulunacak değerin, bir çok başarı faktöründen bağımsız olarak elde edilmesi düşünülemez. Bu değerler, işletmenin bir çok bölüme ayrılması ve ayrılan bölümlerin tek tek analizi ile elde edilebilecektir. Örneğin: aşağıdaki örnek bölümleme de ki gibi:

- Yönetim ve organizasyon,
- Personel,
- Finans,
- Ürün, piyasa,
- Teknoloji
- İşletme yeri ve çevre.

Ayrıntılı başarı analizinden elde edilen sonuçların ağırlıklı ortalaması alınarak bir derecelendirme rakamı elde edilecektir. Bu derecelendirme rakamı daha sonra, örneğin uluslararası derecelendirme kuruluşu S&P`nin derecelendirme ölçütlerine uyarlanabilecektir (AAA`dan D`ye kadar, derecelendirmede "AAA" en yüksek notu, "D" ise en kötü notu sembolize etmektedir).

b) Risk Faktörleri

Başarı analizine paralel olarak aynı zamanda risk analizinin de gerçekleştirilmesi gereklidir. Bu saye de işletmenin risk derecesi hakkında da bilgi sağlanmış olunur. İşletmenin risk derecesi hakkında bilgi elde edilirken, her risk faktörü, ayrı bir risk sınıfına göre değerlendirilir. Yapilan değerlendirmeler sonucunda işletme hakkında aşagıda gösterildiği gibi bir risk derecelendirmesi yapilabilir.

0 = Hiç risk yok
I = Düşük derece risk
II = Orta derece risk
III = Yüksek risk

c) Derecelendirmenin Faydaları

İşletme derecelendirmesi hem işletmenin kendini değerlendirmesi, olumlu ve olumsuz yönlerini tanıması ve işletmenin gelişimi hakkında bilgi edinmesi

açısından, hem de işletme ile ilgili üçüncü kişilerin bilgi gereksiniminin karşılanması açısından önemlidir. Derecelenme sayesinde karar vericilerin karar verme işlevini daha kolay ve anlamlı olarak yerine getirmeleri sağlanacaktır. Bu anlamda da derecelendirme işleminin üstlendiği bu görevi tam olarak yerine getirebilmesi için aşağıdaki noktalarda odaklanması gerekmektedir.

- Tüm subjektif unsurlardan arındırılmak,
- Elde edilen verilerin objektif verilere dönüştürülmesi,
- Değerlendirme prosedürlerinin objektif olması
- Derecelendirme değerlerinin anlaşılır olması.

Derecelendirmenin sadece özel kurumlara değil aynı zamanda, yatırımcılar, bankalar, iş adamları ve kamu görevlileri gibi bir çok kesime faydası olduğu açıktır. Aynı zamanda derecelendirmeden yararlanan işletmeninde derecelendirme ihtiyacını iyi belirleyip, bu bilgiyi hangi amaçla kullanıcılara sunmak istediğinin bilincinde olması gereklidir.

Matematik ve istatistik metodlarıyla kıyaslandığında işletme derecelendirmesi işletmenin devamlı bir şekilde ilerlemesine ve durumu hakkinda karar vermesini kolaylaştıran yararlı ve etkili bilgiler sunmaktadır. Aynı zamanda hem denetim hem de yönetimin bir aracı olarak işletmedeki iş süreçlerinin verimliliğinin sağlanmasında ve uzun zamanlı başarı elde edilmesinde katkı sağlaması söz konusu olabilecektir.

Ayrıca değerlendirme ölçütlerinin objektif olması, potensiyel yatırımcıların, şirketin finansal yapısındaki risk ve gelecekle ilgili görüş ve perspektiflerin tahminlerini kolaylaştırmaktadır.

Derecelendirmenin işletme sahip ve yöneticileri için sağladığı faydaları da aşağıdaki gibi özetlemek mümkündür:

- Bağımsız bir kuruluş tarafından işletmenin bulunduğu konumun objektif olarak belirlenmesi,
- Derecelendirme oluşumuna başlamadan işletmenin iyileştirme sürecine girmesi (böyle bir potensiyelin oluşması),
- Derecelendirme sonucunda elde edilen notların (derecelendirme değerleri) karşılaştırılabilir olması ,
- Derecelendirme prosedürlerinin oluşturulmasında benzer işletmelerin, derecelendirme rakamlarına uyum sağlanması,
- Şirketin kalitesi ve işletme yapısı hakkında bilgilerin dışarıya duyurulabilmesi,

c) Derecelendirme Bilgilerine Gereksinim Duyan Kesimler

Hissedarlar: Yatırım kararları ve risk değerlendirme aracı gibi ihtiyaçlar için.
Kredi Kuruluşları (bankalar): Kredi verme kararlarında ve kredi miktarı ve faiz oranlarının tespiti v.b. karalarda objektif bir bilgiye duyulan ihtiyacı karşılamaktadır.

Kamu: Ekonominin ilerlemesinde ve işletme politikalarının belirlenmesinde yardımcı olmaktadır.
Yönetim ve Çalışanlar: İşletmenin bulunduğu konum hakkında bilgi sahibi olurlar. Bu bilginin getirdiği güven v.b. unsurlar, personelin kendini geliştirmesinde motivasyon saglayabilmektedir.
Medya ve Analistler: Şirket hakkında kesin ve objektif bilgi elde ederler.

d) Derecelendirilme Süreci

Derecelendirme işlemine taraf olan işletme, bağımsız derecelendirme kuruluşu tarafından değerlendirilir. Burada derecelendirme kuruluşunun bağımsız olması, devamlılığının güvencesini oluştrumaktadır. Bu süreç içinde gizlilik çok önemli bir faktördür. Derecelendirme kuruluşu, bağımsız yeminli denetçi gibi davranmak zorundadır. Süreç içinde derecelendirme kuruluşunun denetçileri ki bunlar genelde tecrübeli ve incelenen konuda cok iyi yetişmiş uzman elamanlardan oluşmaktadır. Bu uzmanlar çoğu zamanda derecelendirme süreci içinde karışık takımlar oluşturarak çalışırlar. Bu takımlar çoğunlukla işletme derecelendirilmesi konusunda, finans, üretim ve pazarlama v.b. konularda uzmanlaşmış kişilerden oluşturulur.

Analiz sırasında şirketin, tüm kayıtları, bilançoları v.b. incelenmektedir. Bunun icin çoğu derecelendirme şirketi incelemelerini daha sistemli yapabilmek için bu sürecte çeşitli gelişmiş bilgisayar sitemeleri kullanmaktadırlar.

Derecelendirme sonucu elde edilen not, bağımsız denetçiler tarafından elde edilmiş bir değerdir. Bu değerin oluşmasında derecelendirme kuruluşunun işletme hakkındaki görüşlerinin de bir etkisi söz konusu olacaktır. Almanya da derecelendirme işleminin orta boy işletmelere ortalama maliyetinin yaklaşık 20.000 DM. ile 40.000 DM arasında olduğu tahmin edilmektedir (Pape, 1999: 248-249).

III. Sonuç

Almanya`da özellikle ortaboy işletmelerin sermaye gereksinimlerinin karşılanması, yeni derecelendirme kuruluşlarının hizmetlerinin gelişmesini teşvik edici bir unsur olarak görülmektedir. Bu gereksinim nedeniyle derecelendirme işleminde hedef ortaboy işletmelerdir. Orta boy işletmelerde sermaye ihtiyacı hem daha fazla hemde bu işletmelerin yönetim ve sermaye arasındaki bağlantıları daha sıkıdır. Aynı zamanda borsaya açılmak isteyen işletmelerde bir derecelendirme ihtiyacı ortaya çıkmaktadır. İşletme derecelendirilmesinde hem, finansal rasyo oranları hem yönetim, üretim, piyasa ve teknoloji gibi faktörler hem de işletmenin bulunduğu çevre faktörleri dikkate alınmaktadır. Derecelendirme sonunda elde edilen notların risk değerlendirilmesi ve analizi açısından kullanılabilir bilgiler ifade etmesi ve uluslarası notlarla benzerlik taşıması (karşılaştırılabilir olması) gereklidir. Derecelendirmeden ilk olarak işletme ve yönetim yararlanmaktadır. Ayrıca ortaklar, kredi sunanlar, müşteriler v.b. gruplarda bu bilgiden istifade etmektedirler. Derecelendirme konusunda ülkemizde cok fazla bir gelişme söz konusu değildir, çoğunlukla bankalar, uluslararası derecelendirme kuruluşlarıyla çalışmaktadırlar.

Bankaların bu kuruluşlar ile derecelendirme ilişkisine girme nedeni ise yurt dışı piyasalardaki borçlanma ihtiyacı sırasında aranan bir bilgi olmasından kaynaklanmaktadır.

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BENİM ADIM KIRMIZI 'DA DOĞU İLE BATI, GEÇMİŞ İLE GÜNÜMÜZ ARASINDA DİYALOGARAYIŞLARI

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ÖZET: Son yıllarda sayısı gittikçe artan tarih romanının en yeni örneklerinden olan Orhan Pamuk'un son romanı *Benim Adım Kırmızı*16. yüzyıl Osmanlı nakkaşlarını konu edinen bir cinayet ve aşk romanı olma özelliklerini de taşımaktadır. Pamuk bu romanında 16. yüzyıl Osmanlı sanatçıları ile 20. yüzyıl Türk okuru arasında bir diyalog kurmayı amaçlar. Yazar aynı zamanda romanın postmodern üstkurmaca yapısıyla Doğu ve Batı arasında bir köprü kurmayı da ister. Bu makalenin amacı, Pamuk'un *Benim Adım Kırmızı*'da Doğu sanatını Batılı yazım tekniklerini kullanarak sunduğunu incelemektir. Bu amaç doğrultusunda bu yazıda önce nakkaşların Doğu-Batı sanatlarının biçim farklılıklarını ortaya koyan tartışmaları ele alınacak, sonra da romanın yapısı incelenecektir.

Anahtar Kelimeler: *Postmodern üstkurmaca, Doğu-Batı karşıtlığı, Orhan Pamuk*

ABSTRACT: Orhan Pamuk's latest novel *Benim Adım Kırmızı*(My Name is Red) is a historical, detective and love story concerning the 16th century Ottoman nakkaş (a general term for painters, illuminators and miniaturists in Islamic art). In this novel, Pamuk intends to build up a dialogue between the 16th century Ottoman artists and the 20th century Turkish reader. The writer desires to construct a second type of dialogue, which is between the East and the West, through the novel's postmodern metafictional form. The aim of this paper is to analyze how Pamuk introduces the art of the East by using the technique of the West. To achieve this aim, first the discussion among the nakkaş on stylistic differences in Western and Eastern art will be examined, then the structure of the novel will be scrutinized.

Key words: *Metafiction, East-West dilemma, Orhan Pamuk*

Son yıllarda sayısı gittikçe artan tarih romanının en yeni örneklerinden olan Orhan Pamuk'un son romanı *Benim Adım Kırmızı*16. yüzyıl Osmanlı nakkaşlarını konu edinen bir cinayet ve aşk romanı olma özelliklerini de taşımaktadır. Bir söyleşisinde Pamuk bu romanı yazmaktaki amacının "nakkaşların kederini; yüzlerce yıl bir işe emek verdikten sonra, bugün tamamen unutulmalarını anlatmak" (Çalış1ar, 1998: 5) olduğunu vurgular. Böyle bir anımsatma ile Pamuk 16. yüzyıl Osmanlı sanatçıları ile 20. yüzyıl Türk okuru arasında bir diyalog kurmayı amaçlar. Yazar aynı zamanda romanın postmodern yapısıyla Doğu ve Batı arasında bir köprü kurmayı da ister. Fethi Naci ve Yıldız Ecevit'in de yazılarında değindikleri gibi yeni yazım biçemlerini romanlarında kullanan Pamuk'un son romanlarını "'postmodernist' bir çizgi doğrultusunda yazdığı söylenebilir" (Ecevit, 1996: 41). Orhan Pamuk yazılarını topladığı *Öteki Renkler*'de şöyle der: "Bütün kitaplarım Doğu'nun ve Batı'nın yöntem, usul, alışkanlık ve tarihinin karışmasından yapılmıştır ve kendi zenginliğimi de buna borçluyum." (Pamuk, 1999: 155) Bu makalenin amacı, Pamuk'un *Benim Adım Kırmızı*'da Doğu sanatını Batılı yazım tekniklerini kullanarak sunduğunu incelemektir. Bu amaç doğrultusunda bu yazıda önce nakkaşların Doğu-Batı sanatlarının biçim farklılıklarını ortaya koyan tartışmaları ele alınacak, sonra da romanın yapısı incelenecektir.

Nakkaş1ar kitabın başından sonuna Doğu ve Batı ressamlarının farklarını ortaya koyarlar. Batıda ressamlar gerçeğe uygun resim yapabilmek için 'perspektif' ve 'gölge' gibi değişik teknikler kullanırlar. Örneğin, nakkaşlar pek çok kez İtalyan ressamların portrelerinin çok gerçekçi olduklarını dile getirirler. Roman kişilerinden Şeytan, Batılı ressamların kullandığı bu gerçekçi üslubu insanı tapılacak put gibi gösterdiği için eleştirir:

> Beylerin, papazların, zengin tüccarların ve hatta kadınların bile gözlerinin rengini, tenlerinin dokusunu, dudaklarının benzersiz kıvrımını hatta kulaklarından fışkıran kıllara varana kadar her şeyi olduğu gibi resmedip göstermekle yetinmiyorlar, sanki insan secde edilecek bir yaratıkmış gibi onları resimlerinin tam merkezine yerleştirip bu resimleri tapılacak put gibi duvarlara asıyorlar. İnsan, gölgesi bile bütün ayrıntısıyla resmedilecek kadar önemli bir mahluk mudur? (Pamuk, 1998: 333)

Batıdaki ressamların aksine Osmanlı nakkaşları üsluplarını açıkça ifade etmekten ve resme imzalarını atmaktan kaçınırlar. Çünkü İslam kurallarına göre resim günahtır. Nakkaş Kara, Batılı ressamları taklit ederlerse yaptıkları nakışların resme dönüşeceğini ve bunu da Kuran-ı Kerim'in yasakladığını açıklar (Pamuk, 1998: 448).

Nakkaşlıkta ustalık kazanabilmek için nakkaşların kendilerinden önce gelen ustaları taklit etmeleri gerekir. Örneğin, Padişah'ın oğlunun sünnet töreni için hazırlanan *Surname* adlı kitap aynı ziyafet sahnesinin ikiyüz sayfada anlatılmasından oluşur. Bu tekrarlar sayesinde nakkaşlar kendi üsluplarını gizlemeyi başarırlar. Nakışta kullanılan tekrarlar romanın yapısında da göze çarpar. Üstat Osman'ın nakkaşlarından, Kelebek, Leylek ve Zeytin'den her biri sırasıyla nakış ile üslup, zaman ve hafıza ilişkisi üzerine üçer öykü anlatırlar. Herbirinin ilk öyküsü Arap alfabesinin ilk üç harfi olan "elif", "be" ve "cim" olarak adlandırılır. Süha

Sertabiboğlu'na göre Pamuk, "Bu tekrarlamalarla, yüzlerce yıldır hep aynı şeyleri aynı figürlerle tekrarlayıp duran minyatürün, nakışın bu özelliğini roman anlatımında kullanmıştır." (Setabiboğlu, 1999: 14)

İslam öğretisinde bireysellik hor görüldüğü için nakkaşlar gördüklerini gerçekçi bir şekilde resmetmekten kaçınırlar. Batılı ressamların aksine, nakkaşlar bir model kullanmaksızın, hafızalarından çizerler. Üstat Osman ayakları yere bassın diye çizme edimine toynaklardan başlayan nakkaşlarıyla "atı ezberden, bir hamlede" (Pamuk, 1998: 307) çizdikleri için gurur duyar. At ise nakkaşları, koşan atları tıpkı bir tavşan gibi iki ayağı önde resmettikleri için yerden yere vurur (Pamuk, 1998: 253). Hafızadan başka körlük de bir nakkaş için uzun çalışmaları sonucunda elde ettiği ilahi bir ödüldür. Çünkü körlük ve hafıza sayesinde dünyayı tıpkı Allah'ın gördüğü gibi göreceklerine inanırlar. Örneğin, Üstat Osman saraydaki resimlere baktıktan sonra ünlü nakkaş Behzat'ın kullandığı iğne ile kendini kör eder, böylece "gördüğü nakışları sonsuza dek körlük ve hafızaya nakşeder." (Parla, 2000: 360) Zeytin ise körlükle ilgili düşüncelerini şöyle dile getirir:

> Nakıştan önce bir karanlık vardı ve nakıştan sonra da bir karanlık olacak. Boyalarımızla, hünerimiz ve aşkımızla Allah'ın bize, görün, dediğini hatırlarız.... Büyük üstatların resim aşkı, renklerin ve görmenin karanlıktan yapıldığını bilip, Allah'ın karanlığına renklerle dönmeyi ister. Hafızası olmayan ne Allah'ı hatırlar, ne de onun karanlığını. Bütün büyük üstatların resmi, renklerin içinde, zamanın dışındaki o derin karanlığı arar. (Pamuk, 1998: 91-2)

Nakkaşın görevi Allah'ın yaratısını kendi bireysel hünerini gizleyerek yansıtmak olduğu için, nakışlarında üsluplarını açığa vuranlar küçümsenir. Bir nakkaş olan Katil'e göre nakkaşın ustalığı o resme bakanlar tarafından tanınmayacak şekilde, kişi1iğiyle ilgili hiç iz bırakmadan resmetmekte yatar. Ona göre üslup "kişisel bir iz bırakmamıza yol açan bir hatadır yalnızca." (Pamuk, 1998: 27) Kelebek ise nakkaşın imzası ve üslubunun "kusurla küstahça ve aptalca böbürlenmekten başka bir şey" (Pamuk, 1998: 80) olmadığını söyler.

Üslup ve bireysel ifadeyi reddetme Müslümanlığın sanatçılar üzerinde kurduğu bir baskının sonucudur. Yasaklanmamak için Doğu sanatının kurallarına uymak durumundadır nakkaşlar. Oysa, bireysel hünerlerini saklamak durumunda bırakılmaktan rahatsız olduklarını da dile getirirler. Katil, nakkaş Zarif'i bazı nakkaşları Batılı ressamları taklit etmekle suçladığı için öldürdüğünü açıklar. Hem Katil hem de Kara bir konuşmalarında her nakkaşın gizliden bir üslubu olmasını istediğini dile getirir (Pamuk, 1998: 452). Nakkaş Enişte de Doğu-Batı sentezini savunur (Pamuk, 1998: 186). Çünkü Kuran'daki sureye göre hem Doğu hem de Batı Allah tarafından yaratılmıştır. Enişte nakkaşların bu sentezi elde edebilmeleri için İtalyan ressamlardan gölge tekniğini öğrenmeleri gerektiğini düşünür.

Enişte'nin kızı, Kara'nın karısı Şeküre'ye göre resim sanatındaki Doğu-Batı çatışması çözülememiş bir sorundur ve sonunda nakkaşlar bu sanatı terketmişlerdir (Pamuk, 1998: 468). Nakkaşlığın geleceğine dair romanda bir takım imalarda bulunulur. Katil Enişte'yi öldürmeden önce ona nakkaşların ne zaman toplum tarafından anIaşılıp, onlara değer verileceğini sorar. Enişte'nin bu soruya yanıtı çok

kesindir: "Hiçbir zaman!" (Pamuk, 1998: 196) Çünkü gelecekte insanlar Batı'daki ressamların gerçekçi üslubunu nakkaşların kullandığı canlı renklere tercih edeceklerdir.

Orhan Pamuk nakkaşlığın tarihsel bir değerlendirmesini yaparken postmodern "üstkurmaca" (metafiction) roman yapısını kullanır. En geniş tanımıyla üstkurmaca "kurmaca metin hakkında bir kurmaca - yani, kendi anlatısı ve/veya dilbilimsel özellikleri hakkında açıklamalar içeren kurmacadır." (Hutcheon, 1984: 1) Yani roman kişileri romanın yazılışına dair açıklamalarda bulunurlar. Üstkurmacanın özelliklerinden olan "metinlerarasılık" (intertextuality), "parodi", yalan söyleme ve okuru anlatıya katılmaya zorlayan diğer anlatım oyunları Pamuk'un romanında da vardır.

Metinlerarasılık, yani yazarın daha önce yazılmış metinlerden yararlanması, onlara göndermelerde bulunması, postmodern yazar için önemli bir kavramdır. Çünkü "hiçbir yazın metni artık özgün değildir, eğer öyle olsa, okur için bir anlam ifade edemez. Yalnızca kendinden önceki diğer söylemlerin bir parçası olduğunda bir anlam ve önem kazanır." (Hutcheon, 1988: 126) Pamuk'un romanı Doğu-Batı karşıtlığını ortaya koyarken Kuran'dan alıntılar yapar. Kitap, roman kişilerinin de tekrar ettiği Kuran'dan üç sureyle başlar: "Bir adam öldürdüler ve aralarında tartıştılar," (Bakara) "Körle gören bir olmaz" (Fatir) ve "Doğu da Batı da Allah'ındır" (Bakara). Minyatürlerden birinde yer alan Köpek okura Kuran'da anlatılan yedi gencin öyküsünü anımsatır. Pamuk ayrıca eski Doğu öykülerinden ve tarihi olaylardan da yararlanır. Kitabın pekçok yerinde roman kişileri, Hüsrev ve Şirin, Leyla ve Mecnun'un öyküsünü anlatır ya da Osmanlı sultanları, saray yaşantısı ve eski Çin, Hint ve Heratlı nakkaşların resimleri hakkında bilgi verirler. Pamuk'un da bir söyleşide dile getirdiği gibi romanın ölümden sonraki yaşama dair bölümleri El Cevziye'nin Kitab-ı Ruh'undan ve eskatoloji kitaplarından yararlanılarak yazılmıştır (Çalışlar, 1998: 5). Başkalarının öykülerini anlatma, roman kişileri tarafından da tartışılır. Örneğin, Kara Katil ile olan konuşmasında öykülerin herkese ait olduğunu vurgular. Katil'in Kara'ya cevabı, "Frenk üstatlarının usülleri yayıldıkça herkes başkalarının masalını kendi hikayesi gibi anlatmayı marifet sanacak," (Pamuk, 1998: 452) postmodernizmdeki metinlerarasılığa yapılan bir göndermedir.

Benim Adım Kırmızı kendinden önce yazılmış metinlere yaptığı göndermelerin yanısıra parodi yoluyla meddahlık sanatına güncellik kazandırmaya da çalışır. Roman, hem kişilerin hem de at, köpek, kalp para, Şeytan ve hatta kırmızı rengi gibi nesne ve kavramların öyküyü değişik açılardan ele aldığı pekçok "birinci tekil şahıs anlatıcı" tarafından aktarılır. "Ben Ölüyüm," "Benim Adım Kara," "Ben, Köpek" gibi bölüm başlıkları her bölümün bir meddah tarafından seslendirildiği havasını yaratır. Böylece, romanın tarihsel içeriği geleneksel öykü anlatma yöntemi olan meddahlıkla bütünleşmiş olur, ama yazarın meddahlığı ele alış biçimi mesafelidir. Linda Hutcheon postmodern kurmacanın parodiyi alay etmek amacı gütmeksizin "benzerliklerin içindeki farklılıkları ortaya koymak" (Hutcheon, 1988: 126) için kullandığını söyler. Ona göre, "parodi çelişkili olarak hem değişim hem de kültürel

devamlılığı sağlar" (Hutcheon, 1988: 26). Hutcheon parodinin amacının geçmişi yoketmek değil, aslında geçmişi hem korumak hem de sorgulamak olduğunu ve bunun da postmodern ikilemi yarattığını vurgular (Hutcheon, 1988: 126).

Pamuk'un romanında meddah kadın kılığına girdiğinde ona "bir erkek kadın gibi giyinemez" diyenlere karşı çıkar. Fakat meddahın bu davranışı onun sonunu da hazırlar, çünkü meddah bunu sanat için yapıyor olsa da Müslümanlıkta bir erkeğin kadın gibi giyinmesi ve davranması hiçbir şekilde kabul edilemez. Başka bir deyişle, nakkaşlar gibi meddah da kendi sanatının sınırlarını bilmelidir. Orhan Pamuk bu sorunu şöyle dile getirir:

> Kitabımın kendi gözükmez, sesi gözükür esas kahramanı Meddah'tır aslında ve kitabımın en kırılgan yanı da onun hazin sonudur. Ben de meddah gibi hissederim; yani baskı altında. Onu yazma, bunu yazma, onu yazarsan şöyle de, annen kızar, baban kızar, devlet kızar, yayınevi kızar, gazete kızar.... Bizim gibi yarı kapalı, yarım yamalak demokrasisi olan, yasakları bol bir toplumda roman yazmak, benim, Meddahımın rolüne birazcık sıvanmaktır, yani illaki siyasi yasaklar değil, tabular, aile ilişkileri, dini yasaklar, devlet, pek çok şey yazarı zorlar. Tarihi roman bu bakımdan bir tür kıyafet değiştirme isteğidir. (Pamuk, 1999: 154)

Hutcheon'ın dedikleri doğrultusunda, Pamuk'un meddahlığı ele alışındaki amaç yalnızca okura Osmanlı sosyal yapısı hakkında ipuçları vererek eski bir geleneği anımsatmak değil, aynı zamanda postmodern öykü anlatıcısıyla meddah arasındaki farklılıkları ortaya koymaktır. Kendini taklit ettiği kişilerle özdeşleştiren meddahın aksine, postmodern yazar yazar-roman kişisi özdeşliğini yıkmış ve kurmaca metnin sınırları dışına çıkmıştır.

Ayrıca, roman katilin kimliğinin açığa çıkarılmasını sürekli geciktirerek cinayet romanındaki kuşku unsurunu da kullanır. Buradaki amaç üstkurmacanın başka bir özelliği olan okura oyun oynamaktır. Hutcheon'ın savunduğu gibi, bir cinayet öyküsünde "okuma edimi ... sunulan bir sorunun yanıtını bulabilmek için ipuçlarını takip ederek yorumlama işidir." (Hutcheon, 1984: 72) Romanın ilk satırlarında Zarif okuyucuya öldürülüşünün öyküsünü şöyle anlatır:

> Şimdi bir ölüyüm ben, bir ceset, bir kuyunun dibinde. Son nefesimi vereli çok oldu, kalbim çoktan durdu, ama alçak katilim hariç kimse başıma gelenleri bilmiyor. O ise, iğrenç rezil, beni öldürdüğünden iyice emin olmak için nefesimi dinledi, nabzıma baktı, sonra böğrüme bir tekme attı, beni kuyuya taşıdı, kaldırıp aşağı bıraktı. (Pamuk, 1998: 9)

Zarif onu kimin öldürdüğünü açıklamaz, çünkü okurun merak etmesini istediğini söyler. Aynı şekilde, Katil'in okura oynadığı oyun kuşkuyu daha da arttırır. İlk kez konuştuğunda herşeyi açıklamak istemez, çünkü okur kendisinin kim olduğunu sözlerinden çıkarmalıdır: "Varsa bir üslubum ve kişiliğim, yalnız nakşımda değil, benim cinayetimde ve kelimelerimde de gizlidir! Bulun bakalım benim kim olduğumu kelimelerimin renginden!" (Pamuk, 1998: 116) der Katil. Böylece, hem resim hem anlatıda, yani hem renk hem de sözlerde, kişiliğin gizlenmesinin ne kadar önemli olduğunun altı çizilir.

Tüm üstkurmacalarda olduğu gibi, okurla oyun oynamak Pamuk'un metninde de önem kazanır. Hutcheon, bilinçli bir şekilde parodiyi kullanan yazın metni okuruna

dair şöyle bir değerlendirmede bulunur: "Okur-roman kişisi özdeşimi pek çok kez yıkılır.... Okura kitabın bir sanat yapıtı olduğunun anımsatılmasıyla, metin, okurun gerçeğe benzerlik konusundaki beklenti ve arzusunun parodisini yapar ve okurun kurmaca dünyasını yaratmadaki rolünün okur tarafından farkına varılmasını sağlar." (Hutcheon, 1984: 139) Okuru şaşırtmak, onun okuma edimini sorgulamasını sağlamak için Köpek okura bir yergiyle seslenir: "Bir köpeğim ben ve sizler benim kadar makul yaratıklar olmadığınız için hiç köpek konuşur mu diyorsunuz. Ama öte yandan da ölülerin konuştuğu, kahramanların bilmedikleri kelimeleri kullandığı bir hikayeye inanır gözüküyorsunuz. Köpekler konuşur, ama dinlemesini bilene." (Pamuk, 1998: 18)

Okur-roman kişisi özdeşimini yıkmak için Pamuk'un romanındaki kişiler okura yalan söylediklerini açıkça ortaya koyarlar. Örneğin, Şeküre okura çöpçatan Ester'in getirdiği mektubu ikinci kez okumadığını söylediğinde aslında okuru yanılttığını itiraf eder (Pamuk, 1998: 104). Söylediği yalanlar için sunduğu mazeret ise şöyledir: "Arada bir bir iki yalan söylesem de, bu benim hakkımda yanlış bir fikir edinmeyesiniz diyedir." (Pamuk, 1998: 55) Şeküre'nin okura yanlış izlenim vermemek için yalan söylediği doğrultusundaki çelişkili açıklamaları okurun kafasını karıştırır. Ester'in aşıklar arasında getirip götürdüğü mektuplarla ilgili tutarsız ifadeleri de okur için oldukça karmaşıktır. Okuma-yazma bilmediğini ifade ettiği halde Kara'ya verdiği mektubu alıntılar ve okura çok çelişkili bir açıklamada bulunur: "Doğru, ben sizin yazınızı okuyamam, ama başkasına okuturum. Mektubunuzu ise pekala kendim okurum. Aklınız mı karıştı?" (Pamuk, 1998: 47) Okuru tanımadığı için mektubu nasıl okuyabildiğini okura açıklamayacağını söyler.

Pamuk'un romanındaki zamana ilişkin göndermeler ve anakronizm de okurun aklını karıştırır. Örneğin, Katil şöyle der: "Şu anlatacağım sıradışı şeyler, hem hepimizin bildiği şimdiki zamanda cereyan etti, hem de sanki geçmişte." (Pamuk, 1998: 179) Tabii ki, okurun bildiği "şimdiki zaman" Katil'in sözünü ettiğinden 500 yıl kadar sonradır. Buna ek olarak, Katil öldüğünde zamanın durduğunu ima eder: "Şimdi bütün zamanlar o zaman olmuştu." (Pamuk, 1998: 461) Bu durumdan sıkılan Katil zamanın dışına çıkmayı ister. Katil'in aksine Enişte öbür dünyadan bize seslendiğinde "hayatın bir dar gömlek olduğu, zamanın ve mekanın zindanlarından çıkınca anlaşılıyor ancak" der (Pamuk, 1998: 268). Öte yandan, Kırmızı renginin kendinden söz ettiği bölümde de zaman kavramına ilişkin sorgulamalar göze çarpar. Kırmızı Tanrı'ya özgü bir tutumla şöyle der: "Her yerde görünürüm. Hayat benimle başlar, her şey bana döner, inanın bana." (Pamuk, 1998: 215) Pamuk, metnin okunmasını güçleştirmek için anakronizmler kullanır. Şeküre romanın son bölümünde Nazım Hikmet'e göndermede bulunur: "Ranlı şair Sarı Nazım'ın bir mesnevisinde merak ettiği şey: Mutluluğun resmi yapılsın isterdim" (Pamuk, 1998: 469) der.

Yalan söyleme ve diğer anlatı şaşırtmacalarının yanı sıra, roman yazımı üzerine açıklamalar kurmaca ve gerçek arasında çelişkili bir bağıntı kurar. Terence Hawkes'a göre "üstkurmacanın en bilindik göstergesi aynı anda hem bir kurmaca yaratmak hem de o kurmacayla ilgili açıklamada bulunmaktır." (Hawkes, 1984: 6) Romanın son bölümünde Şeküre kurmaca yapısının dışına çıkarak Orhan Pamuk'un gerçek yaşamdaki annesi olur ve "Resmedilmeyecek bu hikayeyi, belki yazar diye,

bu yüzden anlattım oğlum Orhan'a" (Pamuk, 1998: 470) der ve üstkurmacanın özelliklerinden olan yalan söylemeye değinerek okuru, Orhan'ın bu öyküyü anlatırken yapmış olacağı abartılara karşı uyarır. Çünkü ona göre oğlunun "hikayesi güzel olsun da inanalım diye kıvırmayacağı yalan yoktur." (Pamuk, 1998: 470) Hawkes'in dediği gibi üstkurmacada "yazarlar metnin içine girer ve roman kişileri yazarlarının 'gerçek'dünyasına adım atar gibi gözükürler" (Hawkes, 1984: 101).

Eserin kurmaca yapısıyla ilgili açıklamalarda bulunmak için roman kişisinin romanın yapısı dışına çıkması *ekphrasis* adı verilen "görsel sanatların sözel olarak sunumu" (Heffernan, 1993: 1) tekniğiyle de ilintilidir. *Benim Adım Kırmızı*'Osmanlı nakkaşlarını konu ettiği için, kitapta Behzat'ın Hüsrev ile Şirin'in aşk öykülerini resmettiği minyatürler gibi ünlü eserlerin anlatıldığı birçok bölüm vardır. Ayrıca, At, Köpek ya da Ağaç gibi figürler meddahın seslendirmesi yoluyla resmin çerçevesinin dışına çıkarak nasıl resmedildiklerini anlatırlar. Romanın yapısında varolan resim ve anlatı arasındaki bu bağıntıya Enişte değinir. Her resmin bir öyküsü olduğunu ve eğer okuyucu öyküyü anlamakta zorlanırsa resmin yardımcı olabileceğini söyler. Ona göre "Resim hikayenin renklerle çiçeklenişidir. Kimse hikayesi olmayan bir resim düşünemez." (Pamuk, 1998: 35)

Sonuç olarak, resim ve anlatı arasında bağıntı kuran Orhan Pamuk'un *Benim Adım Kırmızı*'sı iki boyutlu bir diyalog içerir: ilki unutulmuş Doğu sanatını Batılı bir söylemle sunarak yaratılmaya çalışılan Doğu-Batı diyaloğu, ikincisi de postmodernizmde varolan geçmiş-bugün diyaloğudur. Linda Hutcheon'ın dediği gibi postmodernizm, bugünün ışığında geçmişi yeniden değerlendirme ve geçmişle diyalog kurmayı önerir. Geçmişin varlığını yadsımaz, metinlerin aracılığı olmadan geçmişin anlaşılıp anlaşılamayacağını sorgular." (Hutcheon, 1988: 19-20) Orhan Pamuk'un postmodern üstkurmaca yapısını *Benim Adım Kırmızı*'da kullanmasının amacı da geçmişin unutulmuş değerlerini metni aracılığıyla günümüz okuruna sunmaktır.

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OPTIMISATION OF ECONOMIC ORDER QUANTITY USING NEURAL NETWORKS APPROACH

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ABSTRACT: In this paper, a Back Propagation-Artificial Neural Network (BP-ANN) has been adapted for predicting the required car parts quantities in a real and major auto parts supplier chain. The conventional approach to determine the parts requirements is the Economic Order Quantity (EOQ) method. The ability of neural models to learn, particularly their capability of handling large amounts of data simultaneously as well as their fast response time, are the characteristics desired for predictive and forecasting purposes. Here, the actual data obtained from a major auto parts supplier chain, involving a multi-layer system of supplying auto parts to car dealers, have been used to optimise and develop a BP-ANN model. The model has shown promising results in predicting parts orders with high degree of accuracy.

Keywords: *Artificial Neural Network (ANN), Economic Order Quantity (EOQ).*

ÖZET: Bu makalede, Geri yayılımlı Yapay Sinir Ağ (YSA) yapıları gerçek bir araba parçası sağlayan bir firmaya uygulanmıştır. Klasik yaklaşım, istenen talepleri Ekonomik Sipariş Miktarı (ESM) ile belirlemektir. YSA'nın eğitilebilir olması ve büyük meblağlı setleri paralel ve hızlı çözebilmesi geleceğe dönük siparişleri tahmin etme şansı doğurmaktadır. Burada gerçek bir firmanın akış şeması, ana satıcı firmalarla bağıntıları YSA yaklaşımı ile optimise edilmiş ve yeni bir YSA önerilmiştir. Sonuçların çok doğruya yakın bulunmuş olması, YSA modelinin gelecek vadetmesini sağlamaktadır.

Anahtar Kelimeler: *Yapay Sinir Ağları (YSA), Ekonomik Sipariş Miktarı (ESM)*

INTRODUCTION

The problem of determining the required number of parts in a supplier chain system is well known. The Economic Order Quantity (EOQ) approach is employed for prediction of required quantities by many businesses particularly supplier chains [1]. To find the ‘exact’quantities, the EOQ approach is often complemented by a series of "rule of thumb" expressions. These rules are applied on a basis of the historical learning and hence to reduce the effect of the deficiency of the EOQ method.

The problem of deciding on a required number of parts are further complicated by seasonal variations. This paper offers an alternative approach to the EOQ approach by adapting a neural network model. The neural networks are primarily suited to identifying trends and patterns, particularly when there is a large amount of data. The predictive and forecasting ability of the neural network are of particular interest in parts supply and sales.

The down-side of these networks are the initial stage of application. Adequate data needs to be initially available for training of the network. Then the training phase needs to be followed by testing, verification and the latter two phases need to consider stability problems inherent in neural networks.

1. NEURALNETWORKS – GENERAL

The neural models are basically based on the perceived work of the human brain. The artificial model of the brain is known as Artificial Neural Network (ANNs) or simply Neural Networks (NNs). Neural Networks have many applications. Their ability to learn seemingly large amount of abstract data and to inter-relate different sets of information makes them ideal tools for application in the parts supplier chains.

Generally, however, the ANNs is a cellular information processing system designed and developed on the basis of the perceived notion of the human brain and its neural system. The network is composed of large numbers of neurons and their intra-and inter-connections [2].

1.1 The Biological Model

The brain is highly complex, nonlinear and parallel information processing system. It has the capability to organise its structural constituents known as neurons so as to perform certain computations many times faster than the fastest digital computer in existence today. There exists more than 100 billion neurons of different types highly interconnected with each other via synapses of which there are more than a 150 billion.

Neurons are specialized cells that serve as the functional and structural units of our nervous system. The nervous system itself can be divided into two separate

components: The central nervous system, which consists of the brain and spinal chord, and the peripheral nervous system, which connects the central nervous system with the rest of the body. In turn, the peripheral neurons can be broken down into different divisions, one of which is the sympathetic nervous system. Sympathetic neurons generally act without any conscious control and they participate in many of our physiological responses to stress. The increase in heart rate, sweaty palms, and churning stomach are the result of our sympathetic neurons.

The cell body contains the nucleus of the cell, a warehouse for manufacturing cell machinery. The dentrites radiate outward from the cell body and, in general, receive stimuli from external sources, including other neurons. Once the neuron is stimulated, an electrical impulse travels from the dendrites to the cell body and finally into the axon. The axon propagates the impulse to the synaptic terminal and stimulates the release of chemicals called neurotransmitters. These chemicals can stimulate the dentrites of surrounding neurons if the cellular body accumulates enough electrical potential to overcome a certain threshold, the action potential, and if they do so, the cycle is renewed in the neuron's neighbours. Also note that the rapid, efficient propagation of electrical and chemical impulses is the distinctive characteristic of neurons and the nervous system in general. It generates memories, emotions, and imagination.

1.2. Artificial Neural Network

The neurons operate collectively and simultaneously on most for all data and inputs which performs as summing and nonlinear mapping junctions. In some cases they can be considered as threshold units that fire when total input exceeds certain bias level. Neurons usually operate in parallel and are configured in regular architectures. They are often organized in layers, and feedback connections both within the layer and toward adjacent layers are allowed. Each connection strength is expressed by a numerical value called a weight which can be modified. Also they are characterized by their time domain behaviour which is often referred as dynamics.

In general, the neuron could be modelled as an nonlinear activated function of which the total potential inputs into synaptic weights are applied. It is assumed that synapses can impose excitation or inhibition but not both on the receptive neuron. Also axons are modelled as transmission lines and dendrites are the receptive zones and the synapses are elementary structural and functional units that mediate the interaction between neurons. From the biological view, the artificial model of neuron should consist of three elements (Figure 1). These are,

1. A set of synapses or connection links, each of which is characterized by a weight or strength of its own. Specially, a signal x_j at the input of synapse j connected to neuron k is multiplied by the synaptic weight w_{ki} Unlike a synapse in the brain, the synaptic weight of an artifical neuron may lie in a range that includes negative as well as positive values.

2. An adder for summing the input signals, weighted by the respective synapses of the neuron.

3. An activation function or transfer function for limiting the amplitude of the output of a neuron.

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4. A set of synapses or connection links, each of which is characterized by a weight or strength of its own. Specially, a signal xj at the input of synapse *j* connected to neuron *k* is multiplied by the synaptic weight w_{kj}. Unlike a synapse in the brain, the synaptic weight of an artifical neuron may lie in a range that includes negative as well as positive values.

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6. An activation function or transfer function for limiting the amplitude of the output of a neuron.

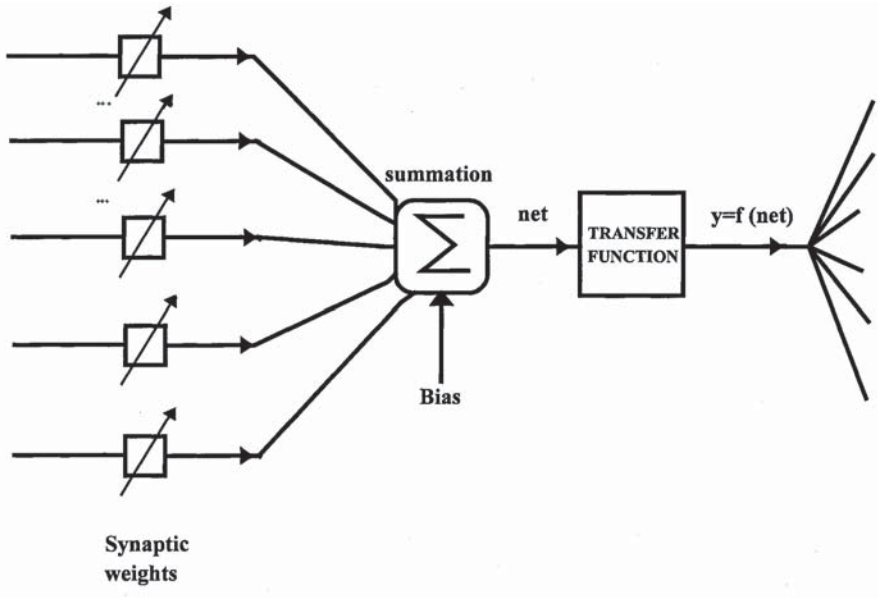

Figure 1. General Block Diagram of a Neuron

The neuron model could also include an externally applied bias, denoted by b_k. The bias b_k has the effect of increasing or lowering the net input of the activation function depending on whether it is positive or negative, respectively. Where $x_1,\ldots,x_m$ are the input signals; $w_{k1},\ldots w_{km}$ are the synaptic weights of neuron *k*. The activation function, denoted by f(net), defines the output of a neuron which considerably influences the behaviour of the network. Here, sigmoid is chosen as an activation function as shown in Figure 2.

Mathematically, the neuron *k* will be described by the following equations:

$$u_k = \sum_{j=1}^{m} w_{kj} x_j \qquad (1)$$

where $x_1,\ldots,x_m$ are the input signals; $w_{k1},\ldots w_{km}$ are the synaptic weights of neuron

k. The activation function, denoted by f(net), defines the output of a neuron which

$$net = u_k + b_k \qquad (2)$$

$$y_k = f(net) \qquad (3)$$

considerably influences the behavior of the network. Here, three basic types of activation function is introduced.

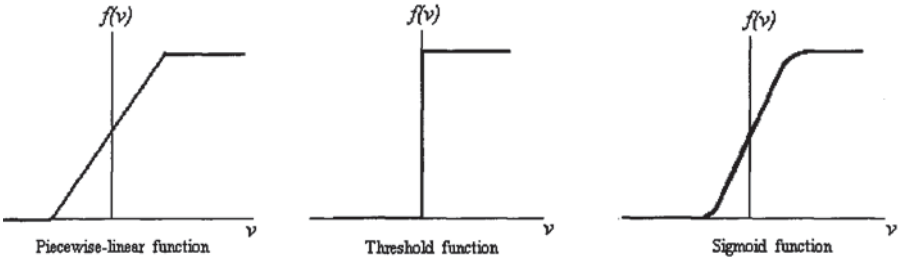

Figure 2. Activation Functions

Piecewise-linear function:

$$f(v) = \begin{cases} 1 & v \geq \frac{1}{2} \\ v & -\frac{1}{2} < v < \frac{1}{2} \\ 0 & v \leq -\frac{1}{2} \end{cases} \qquad (4)$$

Threshold function:

$$f(v) = \left\{ \begin{array}{ll} 1 & \text{if} \quad v \geq 0 \\ 0 & \text{if} \quad v < 0 \end{array} \right\} \tag{5}$$

Sigmoid function:

$$f(v) = \frac{1}{1 + \exp(-av)} \tag{6}$$

where a is the slope parameter of the sigmoid function.

2. APPLICATION OFANNs IN FORECASTING

The data gathered on the purchases by six motor car dealers from a parts supplier during a two-year period was used as input to the artificial neural network described above. Under consideration were 69 different parts supplied to 5 dealers at different times and quantities. The ordering of parts by dealers were arbitrary and were based on previous trends in demand for a given part or immediate request from a customer. It has been difficult for the parts supplier to establish a 'just in time' approach and often their existing 'just in case'method had lead to excessive parts being stored in their central and regional warehouses.

The objective of the current investigation is not to concentrate on the nuts and bolts of how companies in a parts supply chain operate, but to investigate the applicability of ANNs in forecasting auto parts requirements within the chain. It is also of interest to see if a just-in-time approach can be established between the parts supplier and the dealers on the one hand and the dealers and their customers on the other. Such an approach will lead to the timely manufacture and delivery of parts to the parts supplier.

In our case, we have applied Back Propagation Artificial Neural Network (BP-ANN) algorithm. Back propagation is an feedback error correction method which is commonly used in ANN. Our BP-ANN structure has 69 input entries at the input layer layer, corresponding to the all possible input items produced by our sample factory. We prefer 71 hidden layer neurons. Generally, hidden neuron number is chosen greater than input entries. The output neuron number is equal to input entries as 69, since we are estimating the selling amount of same five main dealers with similar items of production.

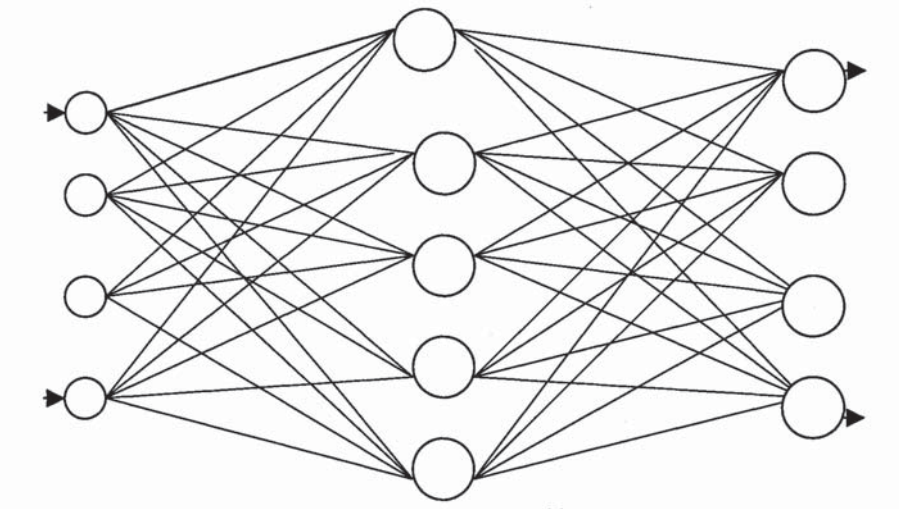

Figure 3. Our proposed ANN model for forecasting problem.

Since we are working on forcasting problem of a real factory, the number of the input entries and output neurons are to be in same. Using Equations (1-6), we estimate five main dealers selling of 69 different items, each corresponding some parts of a car. In our problem, we train the system to the ANN for the past 6 weeks data. After reaching desired training squared sum of error value as 20.77 (Figure 4), we try to find following expected sales using weight coefficients of our BP-ANN model (Figure 4).

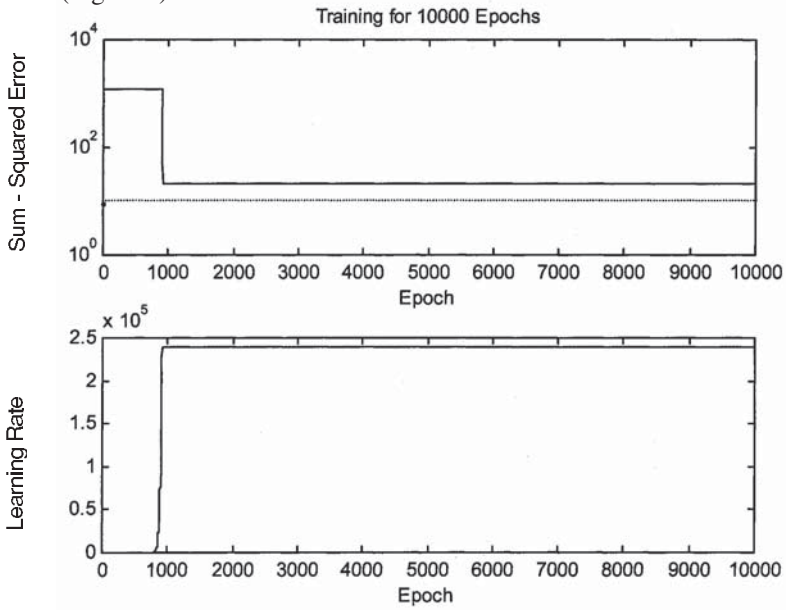

Figure 4. Sum-squared Error and Learning Rate during training procedure. of BP-ANN model for forecasting problem.

Here, Sum-squared Error means that squared difference of all pixel values of input and output matrix are taken and then added, giving a global efficiency parameter of an optimisation problem .

After training procedure is finished with satisfactory results shown as in Figure 4, we use the following 3 weeks of data as an input and forecast the fore-coming 3 weeks future data. As shown in Figure 5, without any training and thus as a real time working, we have found satisfactory squared sum of error as 19.97. Thus we can conclude that our ANN model is suited well for our problem.

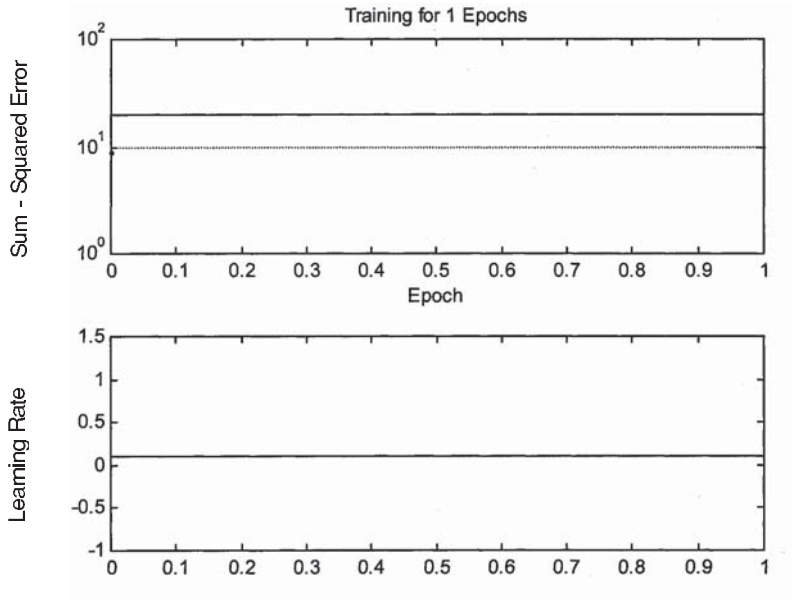

Figure 5. Sum-squared Error and Learning Rate for real data

3. CONCLUSION

In this paper, a Back Propagation-Artificial Neural Network (BP-ANN) model has been developed for the optimisation of parts quantities required in a large auto car supplier chain. The ability of neural models to learn, particularly their capability of handling large amounts (or sets) of data simultaneously as well as their fast response time, are invariably the characteristics desired for predictive and forecasting purposes. The BP-ANN model has 69 inputs, 71 hidden and 69 output neurons. The figure of 5 corresponds to the auto parts under consideration and quantity needs to be predicted.

The model was tested using actual data in a given supplier chain. The predictions as shown are very promising. The model can easily be adapted to have far larger inputs. It is also feasible to consider other forms of Neural Networks.

It has been shown that the model can be adopted for prediction of any flow of components and parts down stream or up stream of supplier chains with high of degree of accuracy.

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Örnekler:

……. (Brook, 1965: 58-63).
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Örnek: (Kitaplar)

GWYNN, R.S. (1993), Drama, New York: Harper Collins Publishers.

Örnek: (Dergiler)

ALEXANDER, W.D.(1976a), "The Competition of Materials", Scientific American, 17(4), 254-62.

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Örnek: (Derlemeler)

BROOK, Peter (1965), "Happy Days and Marienbad", Charles Marowitz, Tom Milne (ed), New Theatre Voices of the Fifties and Sixties. London: Eyre Methuen.

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