

A – Applied Sciences and Engineering

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Anadolu Öniversitesi Bilim ve Teknoloji Dergisi / A – Uygulamalı Bilimler ve Mühendislik

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Prof. Dr. Ersin YÜCEL Anadolu University, Graduate School of Science, 26470 Eskişehir, TURKEY Phone: +90-222-335 05 80 /ext.:1755 Fax: +90-222 3354122 e-mail: eyucel@anadolu.edu.tr

CO-EDITOR IN CHIEF

Assoc. Prof. Dr. Yunus ÖZDEMİR Anadolu University, Graduate School of Science, 26470 Eskişehir, TURKEY Phone: +90-222-335 05 80 /ext.:1755 Fax: +90-222 335 41 22 e-mail: yunuso@anadolu.edu.tr

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CONTACT INFORMATION

Anadolu University Journal of Science and Technology Anadolu University, Graduate School of Science, 26470 Eskişehir, TURKEY **Phone**: +90-222-335 05 80 /**ext.**:1767 **Fax:** +90-222 335 41 22 **e-mail** : btda@anadolu.edu.tr, btd@anadolu.edu.tr

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Books

Haupt R.L. and Haupt S.E. *Practical Genetic Algorithms*. 2nd ed. New York, NY, USA: Wiley, 2004.

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Chapters in boks

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Conference proceedings

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