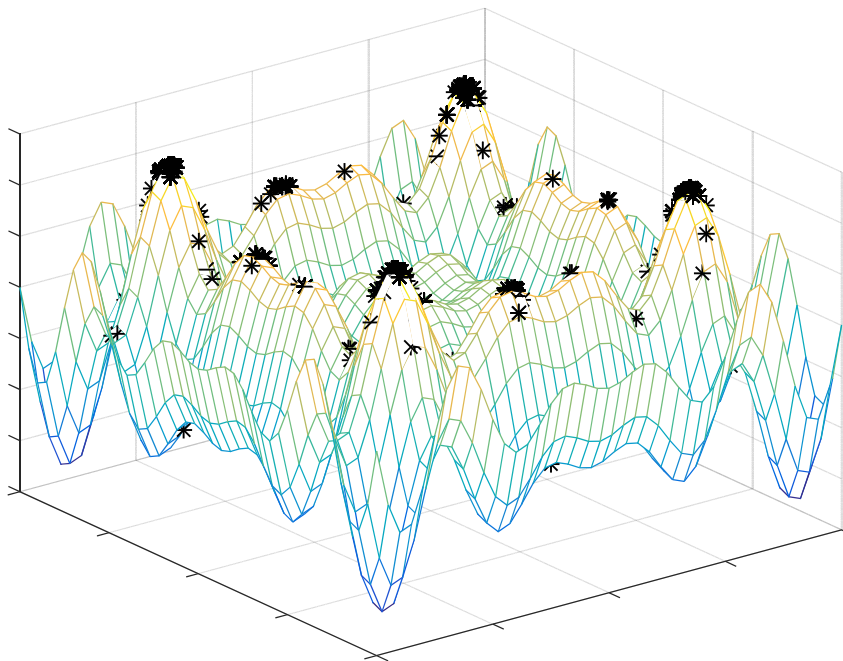




*Leonardo Journal of Sciences*

*Issue 30*

*January-June  
2017*



ISSN 1583-0233



*AcademicDirect*  
Publishing House

# Leonardo Journal of Sciences

ISSN 1583-0233

Issue 30

January-June

2017

## Leonardo Journal of Sciences

<http://ljs.academicdirect.org>

Edited by

AcademicDirect

Tel.: 0766-239997

Editor-in-chief

Lorentz JÄNTSCHI

E-mail: [lori@ljs.academicdirect.org](mailto:lori@ljs.academicdirect.org)

Executive editor

Sorana D. BOLBOACĂ

E-mail: [ljsacademicdirect@gmail.com](mailto:ljsacademicdirect@gmail.com)

Editorial assistant

Vlad C. DĂSCĂLESCU

E-mail: [ljsacademicdirect@gmail.com](mailto:ljsacademicdirect@gmail.com)

Editorial board

- Elena ZAHARIEVA-STOJANOVA, Asist. Prof. Ph.D. Eng., (computer sciences),  
*T. Univ., Gabrovo, BG*
- Ivan SIMEONOV SIMEONOV, Asist. Prof. Ph.D. Eng., (computer systems),  
*T. Univ., Gabrovo, BG*
- Rosen STEFANOV IVANOV, Asist. Prof. Ph.D. Eng., (computer technologies),  
*T. Univ., Gabrovo, BG*
- Gheorghe LAZEA, Prof. Ph.D. Eng., (automatics),  
*T. Univ., Cluj-Napoca, RO*
- Mădălina Ana VĂLEANU, Asist. Prof. Ph.D. Sci., (informatics),  
*'IH'-MPU Cluj-Napoca, RO*
- Radu Tiberiu TRĂMBIȚAȘ, Assoc. Prof. Ph.D. Sci., (mathematics),  
*'IH'-MPU Cluj-Napoca, RO*
- Eugen CULEA, Prof. Ph.D. Sci., (physics),  
*T. Univ., Cluj-Napoca, RO*
- Mircea Vasile DIUDEA, Prof. Ph.D. Sci., (chemistry),  
*T. Univ., Cluj-Napoca, RO*
- Meenu VIKRAM, Res. Assoc. Ph.D. Sci., (biology),  
*Texas A&M University, USA*
- Amarendra Narayan MISRA, Prof. Ph.D. Sci., (biotechnology),  
*Texas A&M University, USA*
- Anca BUTNARU, Asist. Prof. Ph.D. Med., (medicine),  
*'IH'-MPU Cluj-Napoca, RO*
- Tiberiu RUSU, Prof. Ph.D. Eng., (environment),  
*T. Univ., Cluj-Napoca, RO*
- Tarek BOUKTIR, Prof. Ph.D. Eng., (engineering),  
*C.U. d'Oum El Bouaghi, DZ*
- Mircea SAVATTI, Prof. Ph.D. Eng., (agriculture),  
*ASVMU Cluj-Napoca, RO*
- Radu Emil SESTRĂȘ, Prof. Ph.D. Eng., (horticulture),  
*ASVMU Cluj-Napoca, RO*

## Contents

- 1. A review of the clonal selection algorithm as an optimization method**, by Ahmed Y. HATATA, Mohamed G. OSMAN, Mohamed M. ALADL ..... p. 1-14
- 2. Mechanical properties and water absorption behaviour of treated pineapple leaf fibre reinforced polyester matrix composites**, by Oluyemi O. DARAMOLA, Adeolu A. ADEDIRAN, Benjamin O. ADEWUYI, Olamigoke ADEWOLE ..... p. 15-30
- 3. Modeling and simulation for smart grid integration of solar/wind energy**, by Ali MEKKAOUI, Mohammed LAOUER, Younes MIMOUN ..... p. 31-46
- 4. Development and production of brake pad from sawdust composite**, by Sadiq S. LAWAL, Katsina C. BALA, Abdulkareem T. ALEGBEDE ..... p. 47-56
- 5. Characterization and application of *Mucuna urens* seed husk as novel biosorbent for sequestration of some divalent metal ions from solution**, Linda O. ELUKE, Kovo G. AKPOMIE, Helen O. CHUKWUEMEKA-OKORIE, Vincent I. AJIWE ..... p. 57-79