

## Mechanical Engineering

**Sharif**

1

**Spring  
2018**

Editors-in-Chief: Abolhassan Vafai and Seyed Taghi Akhavan Niaki

This Journal is published under the auspices of Sharif University of technology, Office of the Vice-Chancellor-in-Charge of Research.

The Journal is published Semiannually in Farsi language, aims at establishing a relationship between scientists active in different branches of science and technology and, in particular, at providing a forum for exchange of knowledge between scientists and technologists related to scientific problems prevailing in contemporary society. The journal also strives to present practical and theoretical analyses of these issues and facilitates the circulation of modern scientific findings by scientists and researchers for practical application. In addition, “**Sharif**” publishes original papers focusing on issues of specific concern to universities, including research, technological advancements, and topics related to matters of higher education.

**P.O.BOX 11155-8639 AZADI AVENUE, TEHRAN, I.R. IRAN**

**Phone: (98-21) 66005419 - 66164093 Fax: (98-21) 66012983**

**Web: <http://journal.sharif.ir/> [http:// www.globalsciencejournals.com](http://www.globalsciencejournals.com)**

**E-mail: [pajouhesh@sharif.edu](mailto:pajouhesh@sharif.edu)**

## CONTENTS

- 3 **THE EFFECT OF VACANCY DEFECTS ON LINEAR VIBRATION OF GRAPHENENANO-RESONATOR SENSOR VIA MOLECULAR STRUCTURAL MECHANICS METHOD**  
S. Ziaee
- 13 **APPLICATION OF GENETIC ALGORITHM TO MODEL THE SLOSHING PHENOMENON IN THE RECTANGULAR STORAGE TANKS**  
H. Saghi
- 23 **NUMERICAL SIMULATION OF PLASMA ACTUATOR IN BOUNDARY LAYER SEPARATION CONTROL BY UTILIZING THE MODIFIED ELECTROSTATIC MODEL**  
J. Omid and K. Mazaheri
- 35 **DETERMINATION OF THE OPTIMAL VALUES OF STIFFNESS FOR ELASTOMER ENGINE MOUNT BASED ON DECOUPLING THE VIBRATIONAL MODES**  
H. Esfandiyari, A. Shooshtari and V. Fakhari
- 45 **AERODYNAMIC ANALYSIS AND SIMULATION OF FLYING BALLAST IN HIGH-SPEED TRAINS**  
M.R. Talaee, H. Bakhtiarizadeh, S. Ghiasvand and M. Poshideh
- 55 **CYCLOSTATIONARY METHOD IN FAULT DETECTION OF ROLLING ELEMENT BEARINGS**  
A. Rohani Bastami and Y. Khanverdi
- 63 **FLIGHT OPERATION IMPROVEMENT OF VARIABLE PITCH QUADROTOR WITH  $H_{\infty}$  OPTIMIZATION AND  $\mu$  SYNTHESIS**  
Y. Sarafraz, F. Shahmiri and S.H. Sadati
- 73 **A BEHAVIOR-BASED APPROACH TO SIMULTANEOUS REALIZATION OF LEADER-FOLLOWING AND OBSTACLE-AVOIDANCE BEHAVIOURS FOR A FLYING ROBOT**  
E. Zibaei and M.A. Amiri Atashgah
- 87 **EXPERIMENTAL STUDY AND FINITE-ELEMENT SIMULATION OF FATIGUE IN OUTER TIE ROD OF STEERING SYSTEM FOR PEUGEOT 405**  
A. Fadaei and R. Naderi Gomi
- 97 **SPEED-UP NUMERICAL SOLUTION OF STEADY AND UNSTEADY FLOWS WITH FPGA HARDWARE**  
A. Ebrahimi and M. Zandsalimy
- 105 **FREE VIBRATION ANALYSIS OF LAMINATED COMPOSITE TRAPEZOIDAL PLATE RESTING ON THE PASTERNAK FOUNDATION**  
R.A. Jafari-Talookolaei and M. Abedi
- 117 **PERFORMANCE REVIEW OF EXERGY EFFICIENCY AND ENTROPY GENERATION BY OPTIMIZATION OF WIND TURBINES BY PSO OPTIMIZATION ALGORITHM**  
R. Yazdanparast and N. Kordani
- 125 **THERMO-ELECTRO-MECHANICAL ANALYSIS OF CYLINDRICAL SHELL MADE OF FUNCTIONALLY GRADED PIEZOELECTRIC MATERIALS USING ARBITRARY HIGHER-ORDER SHEAR DEFORMATION THEORY**  
S.M. Jabbari and S.M. Zamani Nejad

### REVIEW ARTICLE:

- 137 **DESIGN AND CONSTRUCTION OF MECHANICALLY CLOSED LOOP GEARBOX TEST RIG AND POWER LOSS INVESTIGATION OF THESE SYSTEMS**  
Sh. Mozafari, M. Rezaade Mohammadi, S. Dolatkhan Takaloo and M. Mardani

### APPENDIX

- 162 **ABSTRACTS OF PAPERS IN ENGLISH**