

Revista
Facultad 74
de Ingeniería

UNIVERSIDAD DE ANTIOQUIA

marzo 2015

N.º 74
March, 2015
ISSN 0120-6230

Rector:

Alberto Uribe Correa

Dean:

Carlos Alberto Palacio Tobón

Editor-in-Chief

Maryory Astrid Gómez Botero

Editorial Board

Luis Ribeiro

Geosistemas

Instituto Superior Técnico

Lisboa, Portugal

Eduardo Miró

Instituto de Investigaciones en Catálisis y

Petroquímica (INCAPE, CONICET)

Santa Fe, Argentina

Octavio Armas Vergel

ETS Ingenieros Industriales Ciudad Real,

Universidad de Castilla-La Mancha, España

Jean Denis Taupin

HydroSciences, Institute de recherche pour le
développement

Montpellier, Francia

Román Hermida

Facultad de Informática

Universidad Complutense de Madrid,

España

Oscar Rosa Mattos

Dpto. Metalúrgica y Materiales

Universidade Federal do Rio de Janeiro, Brasil

Eduardo Sánchez

École Polytechnique Fédérale de Lausanne, Suiza

Watson Vargas Escobar

Dpto. de Ingeniería Química

Universidad de los Andes, Colombia

John Ramiro Agudelo Santamaría

Dpto. de Ingeniería Mecánica

Universidad de Antioquia, Colombia

Jorge Andrés Calderón Gutiérrez

Dpto. de Ingeniería de Materiales

Universidad de Antioquia, Colombia

Sebastián Isaza Ramírez

Dpto. Ingeniería Electrónica

Universidad de Antioquia, Colombia

Julián David Arias Londoño

Dpto. Ingeniería de Sistemas

Universidad de Antioquia, Colombia

Scientific Board

Jesús Casanova Kindelan

Ingeniería Energética y Fluidomecánica

Universidad Politécnica de Madrid, España

Esteban Abad Holgado

Investigaciones Químicas y Ambientales, CSIC

Barcelona, España

Georgina Fernández Villagómez

Ingeniería Química

Universidad Nacional Autónoma de México

Néstor Jaime Aguirre Ramírez

Escuela Ambiental

Universidad de Antioquia, Colombia

Administrative Assistant

Sandra Hernández Barrientos

Proofreading

Juan Fernando Zabala C.

Sandra Milena Zuluaga Salazar

Juan David Ángel Gutiérrez

English Proofreading

Carlos A. Vega Posada

Book Cover

Image made with Ingeni-Art, an evolutionary painting algorithm adapted by Walter Alonso Ardila and Mario Eliecer Hoyos from the SICOSIS research group at Universidad de Antioquia.

Design, layout and printing

L. Vieco S.A.S.

comercial@lvieco.com

Post

Reduced postal fare N° 842

E-mail

revistaingenieria@udea.edu.co

Web site

<http://aprendeenlinea.udea.edu.co/revistas/index.php/ingenieria>

The contents or any other legal restriction related to the articles is responsibility of the authors.

This issue was supported by the Universidad de Antioquia's Journals Fund.

Objective of Revista Facultad de Ingeniería

“The principal objective of the *Revista Facultad de Ingeniería* is to promote the publication of original and unpublished articles derived from experimental research or from engineering simulations, developed by researchers and experts from national or international, public or private institutions.”

Table of contents

EDITORIAL	7
Metodología de diseño aplicada a un sistema fotovoltaico con topología de inductor en derivación	9
<i>Juan Carlos Yris-Pastor, Jorge Hugo Calleja-Gjumlich, Leobardo Hernández-González, José Armando Olmos-Lopez</i>	
Fuzzy control techniques applied to a three phase synchronous rectifier current loop	23
<i>Alberto Berzoy-Llerena, Victor Manuel Guzman-Arguis, Maria Isabel Gimenez de Guzman, Jose Restrepo-Zambrano, Jose Manuel Aller-Castro</i>	
New relation to improve the speed and torque characteristics of induction motors	37
<i>Luis Antonio Mier-Quiroga, Jorge Samuel Benítez-Read, Régulo López-Callejas, José Armando Segovia-de-los-Ríos</i>	
Low complexity demodulator for BFSK waveforms based on polygonal approximation	50
<i>Jorge Torres-Gómez, Fidel Ernesto Hernández-Montero, Joachim Habermann</i>	
Band-Pass filters using OSRR cells	60
<i>Iván Díaz-Pardo, Carlos Arturo Suárez-Fajardo, Gustavo Puerto-Leguizamón, Tatiana Zona-Ortiz</i>	
Detection and classification of Non-Proliferative Diabetic Retinopathy using a Back-Propagation neural network	70
<i>Jesús Salvador Velázquez-González, Alberto Jorge Rosales-Silva, Francisco Javier Gallegos-Funes, Guadalupe de Jesús Guzmán-Bárcenas</i>	

Comparison of models and standards for implementing IT service capacity management	86
<i>Alleinni Félix-Sánchez, Jose Antonio Calvo-Manzano</i>	
A new algorithm for near-singular integration of 3D Boundary Element Integrals for thin-walled elements	96
<i>Marco Antonio González de León, Luiz Carlos Wrobel, Manuel del Jesús-Martínez</i>	
Experimental characterization of thermal hydraulic performance of louvered brazed plate fin heat exchangers	108
<i>John Turizo-Santos, Oscar Barros-Ballesteros, Armando Fontalvo-Lascano, Ricardo Vasquez-Padilla, Antonio Bula-Silvera</i>	
Design, modeling and dynamic simulation of three double stage gearboxes with different module, mesh stiffness fluctuation and different level tooth breakage	117
<i>Jairo Alberto Ruiz-Botero, Juan Fernando López-López, Héctor Fabio Quintero-Riaza</i>	
An empirical method for the estimation of yield strength on bonds and strands of expanded metal meshes	132
<i>Dimas José Smith-López, Carlos Alberto Graciano-Gallego, Gennifer Nataly Aparicio-Carrillo</i>	
Freeway speed limits under inclement weather conditions	143
<i>Yonggang Wang, Ming Li, Lei Feng</i>	
Uso de lógica difusa para la administración de un sistema disipador de energía en estructuras compuesto por amortiguadores magnetoreológicos	151
<i>Luis Augusto Lara-Valencia, Yamile Valencia-Gonzalez, José Luis Vital de Brito</i>	
The delay of consequences and perceived risk: an analysis from the workers' view point	165
<i>Ignacio Rodríguez-Garzón, Antonio Delgado-Padial, Myriam Martínez-Fiestas, Valeriano Lucas-Ruiz</i>	

A two-stage decision support model for a retail distribution center location	177
<i>Marcia Danieli Szeremeta-Spak, João Carlos Colmenero</i>	
Performance assessment of internal logistics for service companies	188
<i>Vanessa Teresinha Alves, Julio Cezar Mairesse-Siluk, Alvaro Luiz Neuenfeldt-Júnior, Marlon Soliman, Lissandro Dorneles Dalla-Nora</i>	
Influence of meteorology and source variation on airborne PM ₁₀ levels in a high relief tropical Andean city	200
<i>Carlos Mario González-Duque, Johana Cortés-Araujo, Beatriz Helena Aristizábal-Zuluaga</i>	
Efecto del proceso de fusión y envejecimiento en la síntesis de zeotipos a partir de cenizas volantes	213
<i>Jeimer Alexander Lizcano-Cabeza, Luis Fernando Ávila-Ascanio, Carlos Alberto Ríos-Reyes, Luz Yolanda Vargas-Fiallo</i>	

EDITORIAL

Since the beginning of science, motivation for the search of knowledge was simple curiosity. However, nowadays the relationship between science and society has changed. Currently, conducting high quality research in some areas requires expensive equipment and very qualified staff, forcing researchers to compete fiercely for the limited resources and for a greater recognition. The pressure to publish research papers, and the lack of resources, has led to the detrimental of quality and ethics concerns of the published works, sometimes falling into scientific misconducts such as: scientific fraud (misrepresentation in data and results or manipulation thereof, plagiarism), unethical (fictitious authorship, repeated publications) and negligence in publishing (bibliographic mistakes) [1, 2].

There are some requirements that must be considered in any investigation such as: i) the intrinsic need for research, ii) the methodological quality (scientific rigor) and iii) the ethics; certainly, *not all that is technically possible is ethically valid* [3]. Research conducted with these requirements is a fundamental tool for the development of knowledge, without forgetting that the final step in the research process should include the presentation of the results to the academic and scientific community in the best possible manner. Now then, the author's motivations for publishing their work are usually diverse in nature, as to contribute to the advance of the art and knowledge, gain prestige, show intellectual ability, propose a solution to a problem, achieve financial reward, accomplish agreements, etc. However, when personal interests to publish are placed above to the society's interests, it could lead to conflict of interest and unethical conducts; what unfortunately is becoming more common in the scientific community. Whatever the author's interest to publish is, every scientific publication must give priority to the general interests of humanity; relying on criteria such as honesty, authenticity, accuracy, originality, quality of results and ethical principles.

To investigate ethical issues and misconducts, the scientific community has created several agencies and consultative institutions such as the Committee for Scientific Integrity for US, founded in 1990, or the Ethics Committee for Sciences of the Centre National pour Scientific Research for France, founded in 1994, or similar centers in Australia, Denmark, Finland and Norway, among others [2]. In addition, there are agencies that focus on the publishing activity as the Committee on Publication Ethics (Cope), Council of Science Editors (CSE), World Association of Medical Editors (Wame) and the International Committee of Medical Journal Editors (ICMJE), originally known as the Vancouver group [4].

Next, I describe some concepts related to the academic and scientific fraud:

Misrepresentation: when the authors "make up" all or part of the data of a study submitted for publication [3].

Falsification and data manipulation: consists of manipulating research material, equipment, or the different processes involved in the research, as well as changing or omitting data to obtain a favorable result to the interests of the authors [1, 3].

Plagiarism: is the appropriation of ideas, processes, results, or phrases of other authors and present them as original work without citing the source [1, 3].

Self-plagiarism: using texts from the author himself, copied from previously published works without mentioning the original source.

Fictitious authoring: it is a practice to include as an author a person who did not participate in the original work, nor contribute substantially to the development of research [3].

Ghostwriting: occurs when people who have substantially contributed to the work are not listed among the authors [1].

Duplicate publication: consists of the publication, in part or in whole, of a work previously published, in print or electronic media. It is performed without the knowledge of the journal's editors involved [3].

Salami publication: when a work is subdivided into smaller portions to publish them as separate articles. Such isolated papers do not make a substantial contribution and difficult the work of other researchers [2, 3].

Meat extend publication: are papers that are artificially duplicated by the technique of adding results to previously published manuscripts. The article is published with the same conclusions of the previous one.

Maryory Astrid Gómez Botero

Editor-in-Chief
Revista Facultad de Ingeniería
Universidad de Antioquia

References

- [1] P. Avanzas, A. Bayes, L. Pérez, J. Sanchis, M. Heras. "Consideraciones éticas de la publicación de artículos científicos". *Revista Española de Cardiología*. Vol. 64. 2011. pp. 427-429.
- [2] S. Collado, M. Vázquez. "Ética en las publicaciones científicas". *Biociencias*. Vol. 4. 2006. pp. 3-8.
- [3] C. Hernández. "Ética de la publicación científica". *Revista Habanera de Ciencias Médicas*. Vol. 6. 2007. pp. 1-7.
- [4] V. Tur, M. Fonseca, B. Gutiérrez. "Ética de la publicación científica: iniciativas y recomendaciones". *El profesional de la información*. Vol. 21. 2012. pp. 35-41.