Journal of Engineering and Technological Sciences

Journal of Engineering and Technological Sciences welcomes full research articles in the area of Engineering Sciences from the following subject areas: Aerospace Engineering, Biotechnology, Chemical Engineering, Civil Engineering, Electrical Engineering, Engineering Physics, Environmental Engineering, Industrial Engineering, Information Engineering, Mechanical Engineering, Materials Science and Engineering, Manufacturing Processes, Microelectronics, Mining Engineering, Petroleum Engineering, and other application of physical, biological, chemical and mathematical sciences in engineering. Authors are invited to submit articles that have not been published previously and are not under consideration elsewhere.

Starting from Vol. 35, No. 1, 2003, full articles published are available online at http://journal.itb.ac.id, and indexed by Scopus, Index Copernicus, Google Scholar, DOAJ, GetCITED, NewJour, Open J-Gate, The Elektronische Zeitschriftenbibliothek EZB by University Library of Regensburg, EBSCO Open Science Directory, Ei Compendex, Chemical Abstract Service (CAS) and Zurich Open Repository and Archive Journal Database

Publication History

Currently known as:

Journal of Engineering and Technological Sciences

Formerly known as:

- ITB Journal of Engineering Science (2007 2012)
- Proceedings ITB on Engineering Science (2003 2006)
- Proceedings ITB (1961 2002)

Editorial board of Journal of Engineering and Technological Sciences

Editorial board of Journal of Engineering and Technological Sciences				
Chief Editor	Masyhur Irsyam	Indah Rachmatiah S.	El Sayed Youssef	
Bambang Riyanto T.	Faculty of Civil and	Salami	Geology Department,	
School of Electrical	Environmental	Faculty of Civil and	Faculty of Science, Cairo	
Engineering and Informatics ITB,	Engineering ITB, Indonesia	Environmental Engineering ITB, Indonesia	University, Giza, Egypt	
Indonesia	Deddy Kurniadi		Sigit Sukmono	
	Faculty of Industrial	Andrew F. Seybert	Faculty of Mining and	
Editorial Board Tjandra Setiadi	Technology ITB, Indonesia	Dept. Mechanical Eng., Univ. Kentucky, USA	Petroleum Engineering ITB, Indonesia	
(Executive Editor)	Louis Jezequel			
Faculty of Industrial	Structural and System	Tatacipta Dirgantara	Mark van Loosdrecht	
Technology ITB,	Dynamics and Control,	Faculty of Mechanical and	Faculty of Applied	
Indonesia	Ecole Centrale de Lyon,	Aerospace Engineering,	Sciences, Delft University	
	LTDS, Ecully, France	ITB, Indonesia	of Technology, The	
Hasanuddin Z. Abidin			Netherlands	
Faculty of Earth	Teruyuki Kato	Pekik Argo Dahono		
Sciences and	Earthquake Research	Indonesian Engineering	Aiqin Wang	
Technology ITB,	Institute, Univ. of Tokyo,	Association (PII), Indonesia	Center for Eco-material	
Indonesia	Japan		and Green Chemistry,	
		Suwarno	Lanzhou Institute of	
Graeme Fairweather	Masaaki Ookuma	School of Electrical	Chemical Physics,	
Mathematical Reviews	Structural Dynamics	Engineering and	Chinese Academy of	
American Mathematical Society, USA	Titech, Tokyo, Japan	Informatics, ITB, Indonesia	Sciences , P.R. China	

Publication assistant: Dini Sofiani Permatasari & Yuliah Qotimah. Address: *ITB Journal Publisher*, LPPM ITB, Jalan Tamansari 64, Bandung 40116, Indonesia, Tel. (022) 2501759 ext. 121, Fax.: (022) 2504010; e-mail: journal@lppm.itb.ac.id.

Distribution: Distributed to other universities and research institutions for exchange publications, and to regular subscribers.

Subscription per issue: Rp 100.000,- (domestic) and \$50 (overseas). Order form for subscription should be sent to the editorial office.

Reg. No. 691-SIC-UPPGT-SIT-1963, Accreditation No. 81/DIKTI/Kep/2011 (Nov 2011-Nov 2016)

Published by *ITB Journal Publisher*, The Institute for Research and Community Services, Institut Teknologi Bandung, in collaboration with Indonesian Engineering Association (Persatuan Insinyur Indonesia - PII).

Cover Design by Chandra Tresnadi.

i

Table of Contents

1.	Multi-dimensional Inversion Modeling of Surface Nuclear Magnetic Resonance (SNMR) Data for Groundwater Exploration Warsa, Hendra Grandis, Wahyudi W. Parnadi & Djoko Santoso	123
2.	Taguchi Method for Development of Mass Flow Rate Correlation using Hydrocarbon Refrigerant Mixture in Capillary Tube	
	Shodiya Sulaimon, Henry Nasution, Azhar Abdul Aziz, Abdul-Halim Abdul-Rahman & Amer N. Darus	141
3.	H∞ Control of Polynomial Fuzzy Systems: A Sum of Squares Approach Bomo S. Wibowo, Bambang Riyanto Trilaksono & Arief Syaichu-Rohman	152
4.	Parameter Selection of Oscillator Resonant Circuit Based on Stochastic Differential Equation Yan Gang Feng, Huang Xian He & Xu Ning Jing	1 <i>7</i> 0
5.	Measuring the Capacity and Transaction Time of Cash and Electronic Toll Collection Systems Rudy Hermawan Karsaman, Yans Mahendra, Harmein Rahman & Sony Sulaksono	180
6.	Homogeneity of Continuum Model of an Unsteady State Fixed Bed Reactor for Lean CH4 Oxidation Subagjo, Yogi Wibisono Budhi, M. Effendy & Yazid Bindar	195
7.	Increased Error Observability of an Inertial Pedestrian Navigation System by Rotating IMU Khairi Abdulrahim, Chris Hide, Terry Moore & Chris Hill	211
8.	GPU Computing to Improve Game Engine Performance Abu Asaduzzaman & Hin Y. Lee	226