Table of Contents

President's Message 267

Special Issue on Fluid Dynamics: An Introduction 269
Ahmed Farouk AbdelGawad

ARTICLES

CFD Modeling of Spray Formation in Diesel Engines 271
Mohamed Maher, Ahmed Abu-Elhamyel, Omar Hassan, Alaa El-Din Ramadan, Aya Diab, Mostafa Abdelkhalek, Adham Mohamed & Mohamed Abdel-Hay

Direct Numerical Simulations of Turbulent Spray Combustion: Behavior of Scalar Dissipation Rate 295
Abouelmagd Abdelsamie & Dominique Thevenin

Study the Effect of Ceiling Air Diffuser Blade and Lip Angles Using CFD 309
Ahmed Awwad, Mohamed H. Mohamed & Mohamed Fatouh

Numerical Study of Heat Transfer of Water Flow through Pipe with Property Variations 359
Amjad Ali Pasha, A. Mushtaq & Khalid A. Juhany

Announcements 387

Published by

The Engineering & Architecture Research Division of
The Athens Institute for Education and Research
Athens Journal of Technology & Engineering
A journal of The Engineering & Architecture Research Division
of The Athens Institute for Education and Research:
ISSN NUMBER: 2241-8237

Special Editor

• **Dr. Ahmed Farouk AbdelGawad**, Professor of Computational Fluid Mechanics, Vice Dean for Graduate Studies and Research. Faculty of Engineering (NAQAAE Accredited), Zagazig University, Egypt, General Conference Secretary, ICFD12, ICFD13(icfd12.com), General Conference Coordinator, ICFDP8, ICFDP9, ICFD10, ICFD11, Fellow IEF, Assoc. Fellow AIAA, Member ASME, ACS, SIAM, AAAS, ATINER.

Editor of this Journal

• **Dr. Panagiotis Petratos**, Vice-President of Information Communications Technology, ATINER & Fellow, Institution of Engineering and Technology & Professor, Department of Computer Information Systems, California State University, Stanislaus, USA.

• **Dr. Nikos Mourtos**, Head, Mechanical Engineering Research Unit, ATINER & Professor, San Jose State University USA.

• **Dr. Theodore Trafalis**, Head, Industrial Engineering Research Unit, ATINER & Professor of Industrial and Systems Engineering & Director, Optimization & Intelligent Systems Laboratory, The University of Oklahoma, USA.

• **Dr. Virginia Sisiopiku**, Head, Transportation Engineering Research Unit, ATINER & Associate Professor, The University of Alabama at Birmingham, USA.

Editorial & Reviewers' Board

Managing Editor:
Ms. Afrodete Papanikou

Offices: Athens Institute for Education and Research
8 Valaoritou Street, 10671 Athens, Greece
Phone: + 30 210 3634210 Fax + 30 210 3634209
Email: technology-journal@atiner.gr
URL: https://www.athensjournals.gr/ajte
Special Issue on Fluid Dynamics

Table of Contents

| Title                                                                 | Page |
|----------------------------------------------------------------------|------|
| President's Message                                                 | 267  |
| Special Issue on Fluid Dynamics: An Introduction                    | 269  |
| Ahmed Farouk AbdelGawad                                             |      |
| ARTICLES                                                            |      |
| CFD Modeling of Spray Formation in Diesel Engines                   | 271  |
| Mohamed Maher, Ahmed Abu-Elhamyel, Omar Hassan, Alaa El-Din Ramadan,|      |
| Aya Diab, Mostafa Abdelkhalek, Adham Mohamed & Mohamed Abdel-Hay     |      |
| Direct Numerical Simulations of Turbulent Spray Combustion: Behavior| 295  |
| Scalar Dissipation Rate                                              |      |
| Abouelmagd Abdelsamie & Dominique Thevenin                          |      |
| Study the Effect of Ceiling Air Diffuser Blade and Lip Angles Using | 309  |
| CFD                                                                  |      |
| Ahmed Awwad, Mohamed H. Mohamed & Mohamed Fatouh                    |      |
| Numerical Study of Heat Transfer of Water Flow through Pipe with Property Variations | 359  |
| Amjad Ali Pasha, A. Mushtaq & Khalid A. Juhany                      |      |
| Announcements                                                       | 387  |
President's Message

The Athens Institute for Education and Research (ATINER) is pleased to announce the publication of a number of peer reviewed, open access journals of original research work. Most of the articles will be selected from the numerous papers that have been presented at the various annual international academic conferences organized by the different research divisions and units of the Athens Institute for Education and Research. The plethora of papers presented every year will enable the editorial board of each journal to select the best, and in so doing produce a top quality academic journal. In addition to papers presented, ATINER will encourage the independent submission of papers to be evaluated for publication.

The current issue is the fourth from the fourth volume of the Athens Journal of Technology & Engineering published by the Engineering & Architecture Research Division of the Athens Institute for Education and Research (ATINER).

The Head of the Engineering & Architecture Research Division is member of the Editorial Advisory Board. The Academic Members of the research unit are members of the Editorial Board and will assist the editor and the Editorial Advisory Board with the peer reviewing of all submitted papers. Currently, the academic members of the five research units consist of over 100 international experts from about 50 countries.

Gregory T. Papanikos
President
Athens Institute for Education and Research
Special Issue on Fluid Dynamics: An Introduction

This special issue includes technical papers that were peer-reviewed, accepted and orally presented in the Twelfth International Conference of Fluid Dynamics (ICFD12)”, 19-20 December, 2016, Le Méridien Pyramids Hotel, Cairo, Egypt. Fluid dynamics is a sub-subject of fluid mechanics that designates the flow of fluids. Usually, fluids are divided into liquids and gases. Consequently, fluid dynamics has several branches, e.g., aerodynamics, and hydrodynamics, turbomachinery, propulsion, etc. Fluid dynamics covers a wide range of applications, including calculating forces and moments on vehicles (aircraft, automotive, train), determining the mass flow rate and pressure of liquids (petroleum) through pipelines, predicting weather patterns, etc. Fluid dynamics offers a systematic configuration to embrace empirical and semi-empirical laws derived from flow measurement as well as schemes of computational techniques to solve practical problems. By definition, investigation of fluid dynamics problems naturally involves the calculation of various properties of the fluid, such as flow velocity, pressure, density, and temperature, as functions of space and time.
