

Journal of Mechanics of Materials and Structures

PREFACE

Bogdan T. Maruszewski, Wolfgang Muschik, Joseph N. Grima
and Krzysztof W. Wojciechowski

Volume 7, No. 3

March 2012



PREFACE

BOGDAN T. MARUSZEWSKI, WOLFGANG MUSCHIK,
JOSEPH N. GRIMA AND KRZYSZTOF W. WOJCIECHOWSKI

Guest Editors

The International Symposia on Trends in Continuum Physics have been held every three years since 1998. The first three events took place at the Poznan University of Technology in Poznan, Poland. The fourth one took place in Lviv, Ukraine, for the first time outside the European Union. The fifth jubilee Symposium was held July 16–20, 2010 in Msida, Malta.

The first four Symposia were jointly planned and organized by B. T. Maruszewski (Poznan University of Technology), W. Muschik (Technische Universität Berlin) and A. Radowicz (Kielce University of Technology). Organization of the fifth one was possible by courtesy of Joseph N. Grima (University of Malta, Msida, Malta).

One of the main aims of those meetings has been to bring together scientists from Eastern Europe working in different fields of continuum physics, broadly understood, as well as those from Western and Central Europe, in order to extend their cooperation and to create new connections and acquaintances.

Special emphasis was placed on the representation of various concepts applied to different physical fields interacting with each other. The scope of the Symposia includes fundamentals of continuum physics, new trends in thermodynamics and in electrodynamics, physics of materials (encompassing defective crystals, ferroic crystals, liquid crystals, molecular crystals, high-temperature superconductors, semiconductors, plasma, polymers, amorphous media, smart materials, and anomalous phenomena such as auxetics and negative thermal expansion), biophysics, multiphase systems, and multiscale problems. These fields have been developing fast in recent years.

The chairs of the Fifth International Symposium on Trends in Continuum Physics (TRECOP'10), where most of the articles in this issue were presented, would like to acknowledge support by the sponsoring institutions who made the meeting possible. They are:

- Institute of Applied Mechanics, Poznan University of Technology
- Institute of Theoretical Physics, Technical University of Berlin, Berlin, Germany
- Kielce University of Technology, Kielce, Poland
- University of Malta, Msida, Malta
- Institute of Molecular Physics, Polish Academy of Sciences, Poznan, Poland
- Foundation for Development of Poznan University of Technology, Poznan, Poland
- Poznan Division of the Polish Society of Theoretical and Applied Mechanics, Poznan, Poland
- Institute of Environmental Mechanics and Applied Computer Science, Kazimierz Wielki University, Bydgoszcz, Poland,
- Department of Solid State Physics, Gdansk University of Technology, Gdansk, Poland

Krzysztof W. Wojciechowski
Chair of the Scientific Committee

Bogdan T. Maruszewski
 Joseph N. Grima
 Wolfgang Muschik
Symposium Chairs

Scientific Committee

Krzysztof W. Wojciechowski (Institute of Molecular Physics, Polish Academy of Sciences, Poznan, Poland)

Jan Awrejcewicz (Lodz University of Technology, Lodz, Poland)

Vladimir Alshits (Institute of Crystallography, Russian Academy of Sciences, Moscow, Russia)

Arkadi Berezovski (CENS – Institute of Cybernetics, Tallinn, Estonia)

Yaroslav Burak (Institute of Applied Mathematics and Mechanics, Ukrainian National Academy of Sciences, Lviv, Ukraine)

Enzo Ciancio (University of Messina, Messina, Italy)

Yevhen Czaplja (Pidstryhach Institute of Applied Problems of Mechanics and Mathematics, Ukrainian National Academy of Sciences, Lviv, Ukraine)

Juri Engelbrecht (Estonian Academy of Sciences, Tallinn, Estonia)

Joseph N. Grima (University of Malta, Msida, Malta)

Karl H. Hoffmann (Chemnitz University of Technology, Chemnitz, Germany)

David Jou (University of Barcelona, Barcelona, Spain)

Jan A. Kołodziej (Institute of Applied Mechanics, Poznan University of Technology, Poznan, Poland)

Józef Kubik (Kazimierz Wielki University, Bydgoszcz, Poland)

Gerard A. Maugin (University of Paris VI, Paris, France)

Stanisław Matysiak (Warsaw University, Warsaw, Poland)

Wolfgang Muschik (Institute of Theoretical Physics, Technical University of Berlin, Berlin, Germany)

Henryk Petryk (Institute of Fundamental Technological Research, Polish Academy of Sciences, Warsaw, Poland)

Liliana Restuccia (University of Messina, Messina, Italy)

Czesław Rymarz (Institute of Fundamental Technological Research, Polish Academy of Sciences, Warsaw, Poland)

Jarostaw Rybicki (Gdansk University of Technology, Gdansk, Poland)

Igor Selezov (Institute of Hydromechanics, Ukrainian National Academy of Sciences, Kiev, Ukraine)

Stanisław Sieniutycz (Warsaw University of Technology, Warsaw, Poland)

Gwidon Szefer (Cracow University of Technology, Cracow, Poland)

Alfons A. F. van de Ven (Eindhoven University of Technology, Eindhoven, The Netherlands)

Organizing Committee

Chairs:

Bogdan T. Maruszewski (Poznan University of Technology, Institute of Applied Mechanics, Poznan, Poland)

Wolfgang Muschik (Technische Universität Berlin, Institut für Theoretische Physik, Berlin, Germany)

Joseph N. Grima (University of Malta, Msida, Malta)

Secretary:

Roman Starosta (Institute of Applied Mechanics, Poznan University of Technology, Poznan, Poland)

Members:

Jacek Buskiewicz (Institute of Applied Mechanics, Poznan University of Technology, Poznan, Poland)

Andrzej Drzewiecki (Institute of Applied Mechanics, Poznan University of Technology, Poznan, Poland)

Pawel Fritzkowski (Institute of Applied Mechanics, Poznan University of Technology, Poznan, Poland)

Henryk Kaminski (Institute of Applied Mechanics, Poznan University of Technology, Poznan, Poland)

Jerzy Lewinski (Institute of Applied Mechanics, Poznan University of Technology, Poznan, Poland)

Andrzej Radowicz (Kielce University of Technology, Kielce, Poland)

Grazyna Sypniewska-Kaminska (Institute of Applied Mechanics, Poznan University of Technology, Poznan, Poland)

Tomasz Walczak (Institute of Applied Mechanics, Poznan University of Technology, Poznan, Poland)

JOURNAL OF MECHANICS OF MATERIALS AND STRUCTURES

jomms.net

Founded by Charles R. Steele and Marie-Louise Steele

EDITORS

CHARLES R. STEELE Stanford University, USA
DAVIDE BIGONI University of Trento, Italy
IWONA JASIUK University of Illinois at Urbana-Champaign, USA
YASUhide SHINDO Tohoku University, Japan

EDITORIAL BOARD

H. D. BUI École Polytechnique, France
J. P. CARTER University of Sydney, Australia
R. M. CHRISTENSEN Stanford University, USA
G. M. L. GLADWELL University of Waterloo, Canada
D. H. HODGES Georgia Institute of Technology, USA
J. HUTCHINSON Harvard University, USA
C. HWU National Cheng Kung University, Taiwan
B. L. KARIHALOO University of Wales, UK
Y. Y. KIM Seoul National University, Republic of Korea
Z. MROZ Academy of Science, Poland
D. PAMPLONA Universidade Católica do Rio de Janeiro, Brazil
M. B. RUBIN Technion, Haifa, Israel
A. N. SHUPIKOV Ukrainian Academy of Sciences, Ukraine
T. TARNAI University Budapest, Hungary
F. Y. M. WAN University of California, Irvine, USA
P. WRIGGERS Universität Hannover, Germany
W. YANG Tsinghua University, China
F. ZIEGLER Technische Universität Wien, Austria

PRODUCTION contact@msp.org

SILVIO LEVY Scientific Editor

Cover design: Alex Scorpan

See <http://jomms.net> for submission guidelines.

JoMMS (ISSN 1559-3959) is published in 10 issues a year. The subscription price for 2012 is US \$555/year for the electronic version, and \$735/year (+\$60 shipping outside the US) for print and electronic. Subscriptions, requests for back issues, and changes of address should be sent to Mathematical Sciences Publishers, Department of Mathematics, University of California, Berkeley, CA 94720-3840.

JoMMS peer-review and production is managed by EditFLOW[®] from Mathematical Sciences Publishers.

PUBLISHED BY
 **mathematical sciences publishers**
<http://msp.org/>

A NON-PROFIT CORPORATION

Typeset in L^AT_EX

Copyright ©2012 by Mathematical Sciences Publishers

Special issue

Trends in Continuum Physics (TRECOP 2010)

Preface	BOGDAN T. MARUSZEWSKI, WOLFGANG MUSCHIK, JOSEPH N. GRIMA and KRZYSZTOF W. WOJCIECHOWSKI	225
The inverse determination of the volume fraction of fibers in a unidirectionally reinforced composite for a given effective thermal conductivity	MAGDALENA MIERZWICZAK and JAN ADAM KOŁODZIEJ	229
Analytical-numerical solution of the inverse problem for the heat conduction equation	MICHAŁ CIAŁKOWSKI, ANDRZEJ MAĆKIEWICZ, JAN ADAM KOŁODZIEJ, UWE GAMPE and ANDRZEJ FRĄCKOWIAK	239
Analysis of stress-strain distribution within a spinal segment	ZDENKA SANT, MARIJA CAUCHI and MICHELLE SPITERI	255
A mesh-free numerical method for the estimation of the torsional stiffness of long bones	ANITA USCIOLOWSKA and AGNIESZKA FRASKA	265
Rayleigh-type wave propagation in an auxetic dielectric	ANDRZEJ DRZEWIECKI	277
Local gradient theory of dielectrics with polarization inertia and irreversibility of local mass displacement	VASYL KONDRAT and OLHA HRYTSYNA	285
Electromagnetoelastic waves in a vortex layer of a superconductor	BOGDAN T. MARUSZEWSKI, ANDRZEJ DRZEWIECKI and ROMAN STAROSTA	297

