



RZESZOW UNIVERSITY
OF TECHNOLOGY

PROGRAMME

of the

3rd ECCOMAS Thematic Conference on Inverse Problems in Mechanics
of Structures and Materials

IPM 2013

24-27 April 2013, Rzeszów-Baranów Sandomierski, Poland



THE FACULTY OF
**CIVIL AND ENVIRONMENTAL
ENGINEERING**
RZESZOW UNIVERSITY OF TECHNOLOGY

INTRODUCTION

The 3rd International Conference on Inverse Problems in Mechanics of Structures and Materials, called IPM 2013 for short, is organized under the auspices of the European Community in Allied Sciences as one of 22 ECCOMAS Thematic Conferences of 2013. The IPM 2013 is held in Rzeszów – Baranów Sandomierski, Poland 24-27 April 2013. It is a continuation of two previous conferences IPM 2009 and IPM 2011, organized in Łanicut and Sieniawa, Poland.

Inverse Problems in Mechanics (IPM) are related to identification problems; see many titles of submitted papers. These problems correspond to external reverse problems of searching an excitation for known responses of mechanical systems. The other type of the reverse analysis is of internal character. In such cases internal material and structural parameters are identified having known inputs and/or outputs on the macrolevel. IPMs can be ill posed or ill conditioned so they require regularization and various optimization techniques to find satisfactory and stable unique solutions.

The present IPM 2013 gathers 3 general lectures and 30 papers written by 64 authors and co-authors. A great number of 10 papers and a general lecture were analyzed in the field of the wave transferring in solid and liquids. Majority of papers discuss guided-waves monitoring as a base for identifying material parameters or defects in thin plates.

Similarly as in the previous conferences IPM 2009 and IPM 2011, soft biologically inspired methods, i.e. genetic and evolutionary algorithms, immune system and deterministic or Bayesian artificial neural networks, were applied in 10 submitted papers.

Other original analytical, computational and experimental methods are discussed in two general lectures and in 10 submitted papers. General lectures are devoted to the virtual distortion method and to ultrasonic imaging techniques. From among methods applied in papers the following new methods are worth mentioning: semi-analytical or semi-numerical versions of methods for identification material parameters and defects basing on the Structure Health Monitoring testing, novelty detection, FEM based particle filtering, physically global method, adaptive FEM in electromagnetics, modal-free monitoring of structures.

A general lecture and 3 papers are devoted to discussion of the mathematical background and algorithms corresponding to inverse solvers inspired by nature and a hierachic genetic strategy for the analysis of inverse problems.

At the end, 7 papers are worth emphasizing, in which the inverse analyses of various problems of biomedical, thermal and civil engineering, building physics, mechanics of soils and geodesy were carried out.

Symposium and Organizing Committees Chairmen:

Professors T. Burczyński, Z. Mróz and Z. Waszczyzyn

SYMPORIUM CHAIRMEN

T. Burczyński	Silesian University of Technology, Poland
	Cracow University of Technology, Poland
Z. Mróz	Institute of Fundamental Technological Research of the Polish Academy of Sciences, Poland
Z. Waszczyzny	Rzeszow University of Technology, Poland

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CONFERENCE SECRETARIAT

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CONFERENCE SCHEDULE

Wednesday, 24 April 2013

13:00 – 18:30

Registration (1st floor of the Castle)

13:30 – 14:30

Lunch (The Magnate's Restaurant)

14:00 – 15:00

Coffee break (Tylmanowska Gallery)

PORTRAIT ROOM

15:00 – 15:15

Opening ceremony

15:15 – 16:40

Session A-1

16:40 – 17:10

Coffee break

17:10 – 18:30

Session A-2

THE CASTLE MAGNATE'S RESTAURANT

19:00 – 20:40

Welcome reception

20:40 – 21:30

Museum tour (Baranów Castle)

Thursday, 25 April 2013

THE PORTRAIT ROOM

9:00 – 10:50

Session B-1

10:50 – 11:20

Coffee break (Tylmanowska Gallery)

11:20 – 13:00

Session B-2

13:00 – 14:30

Lunch (The Magnate's Restaurant)

14:00 – 15:00

Coffee break (Tylmanowska Gallery)

15:00 – 16:30

Session B-3

16:30 – 17:00

Coffee break (Tylmanowska Gallery)

17:00 – 18:40

Session B-4

BANQUET HALL

19:00 – 22:00

Musketeer Revel

Friday, 26 April 2013

THE PORTRAIT ROOM

9:00 – 10:50

Session C-1

10:50 – 11:20

Coffee break (Tylmanowska Gallery)

11:20 – 12:50

Session C-2

12:50 – 13:00

Closing ceremony

13:00 – 14:30

Lunch (The Magnate's Restaurant)

13:30 – 14:30

Coffee break (Tylmanowska Gallery)

14:30 – 19:00

Bus tour and sightseeing Sandomierz

19:00 – 20:00

Dinner (The Magnate's Restaurant)

Saturday, 27 April 2013

Free time for individual tours and sightseeing

CONFERENCE PROGRAMME

Wednesday, 24 April 2013

13:00 – 18:30

Registration (1st floor of the Castle)

13:30 – 14:30

Lunch (The Magnate's Restaurant)

14:00 – 15:00

Coffee break (Tylmanowska Gallery)

Session A-1

PORTRAIT ROOM

15:00 – 15:15

Opening ceremony

15:15 – 16:00

Plenary lecture:

R. Schaefer, M. Smolka, M. Paszyński, E. Gajda-Zagórska, P. Faliszewski: Essential features of inverse solvers inspired by nature p. 55

E. Gajda-Zagórska, R. Schaefer: Multiobjective hierachic strategy for solving inverse problems p. 17

E. Gajda-Zagórska, R. Schaefer, M. Smolka, M. Paszyński, D. Pardo: Inversion of resistivity logging measurements using a hierachic genetic strategy p. 19

16:40 – 17:10

Coffee break (Tylmanowska Gallery)

Session A-2

PORTRAIT ROOM

17:10 – 17:30

R. Schaefer, M. Smolka, E. Gajda-Zagórska, M. Paszyński, D. Pardo: Solving inverse problems using computing agents: An attempt to a dedicated hierachic memetic strategy p. 53

J. Łaszczyk, A. Mączko, W. Walas, A. J. Nowak: Inverse thermal analysis of the neonatal brain cooling process p. 29

M. Lefik, A. Hummel, M. Amróz: Application of ANN identification of mechanical properties of pavement layers from falling weight deflectometer data p. 27

EC Test Systems

THE MAGNATE'S RESTAURANT

19:00 – 20:40

Welcome reception

20:40 – 21:30

Museum tour (Baranów Castle)

Thursday, 25 April 2013

Session B-1	PORTRAIT ROOM
9:05 – 9:50	<i>Plenary lecture:</i> J. Holnicki-Szulc, Ł. Jankowski: VDM in inverse problems of safety engineering p. 21
9:50 – 10:10	G. Suwała, Ł. Jankowski: Model-free monitoring of structures p. 61
10:10 – 10:30	P. Kiełczyński, M. Szalewski, A. Balcerzak: Inverse determination of the viscosity of liquid using the Love waves p. 25
10:30 – 10:50	J. Orkisz, M. Głowacki: On residual stresses reconstruction using experimental data the PBA and accelerated EA p. 43
10:50– 11:20	Coffee break (Tylmanowska Gallery)
Session B-2	PORTRAIT ROOM
11:20 – 11:40	J. Magiera: L-curve alternative criteria for optimal regularization in physically based global method applied to analysis of neutron diffraction data p. 31
11:40 – 12:00	A. Derewońko: Determination of mechanical properties of flexible elastic multi-layer materials p. 13
12:20 – 12:40	M. Paruch, E. Majchrzak, J. Mendakiewicz: Estimation of thermophysical parameters of cast iron on the basis of temperature measurements p. 47
12:40 – 13:00	E. Majchrzak, M. Paruch: Identification of the burn wound shape on a basis of skin surface temperature – solution of an inverse problem using the evolutionary algorithm coupled with the BEM p. 33
	THE MAGNATE'S RESTAURANT
13:00 – 14:30	Lunch
14:00 – 15:00	Coffee break (Tylmanowska Gallery)

Thursday, 25 April 2013

Session A-3	PORTRAIT ROOM
15:00 – 15:30	<i>Keynote lecture:</i> W. Rachowicz: Application of the adaptive FEM for solution of electromagnetic inverse medium scattering problems p. 51
15:30 – 15:50	A. Poteralski, W. Kuś, T. Bureczyński: Identification of topology of the microstructure using artificial immune system p. 49
15:50 – 16:10	P. Makowski, W. Kuś, G. Kokot: Evolutionary identification of trabecular bone properties p. 35
16:10 – 16:30	M. Depka-Prądzyński, M. Rucka: Reconstruction of structural responses using transmissibility p. 11
16:30 – 17:00	Coffee break (Tylmanowska Gallery)
Session A-4	PORTRAIT ROOM
17:00 – 17:20	M. Słoński: Lamb waves and particle filter for sequential elastic constants identification of aluminum plate p. 57
17:20 – 17:40	M. Tekieli, M. Słoński: Young's modulus estimation and load identification using vision and FEM based particle filtering p. 63
17:40 – 18:00	D. Ziaja, Z. Waszczyzyn: Application of Gauss processes method for prediction of critical loads and identification of concrete strength in RC compressed colums p. 69
18:00 – 18:20	K. Wilk, A. Borowiec: Prediction of consistency parameters of fen soils by neural networks p. 67
18:20 – 18:40	M. Mrówczyńska: SVM technique used for the classification of vertical displacements in geodesy p. 39
19:00 – 22:00	BANQUET HALL Musketeer Revel

Friday, 26 April 2013

Session C-1

9:05 - 9:50

9:50 – 10:10

10:10 – 10:30

10:30 – 10:50

10:50 – 11:20

Session C-2

11:20 – 11:50

11:50 – 12:10

12:10 – 12:30

12:30 – 12:50

12:50 – 13:00

13:00 – 14:00

13:00 – 14:30

14:30 – 19:00

19:00 – 20:00

PORTRAIT ROOM

Plenary lecture:

T. Stepinski, Ł. Ambroziński: Ultrasonic imaging techniques for Lamb waves p. 59

Ł. Ambroziński, Ł. Pieczonka, P. Paćko, T. Uhl: The influence of test parameters on the dispersion curves evaluation used for elastic constants identification p. 9

P. Paćko, Ł. Ambroziński, Ł. Pieczonka, T. Uhl: The impact of numerical analysis parameters on the identification of elastic constants in plate-like structures p. 45

Z. Waszczyszyn, E. Pabisek, Ł. Ambroziński: A semi-analytical method with neural networks for prediction of thin aluminium plate parameters basing on guided-wave testing p. 65

Coffee break (Tylmanowska Gallery)

PORTRAIT ROOM

Z. Dworakowski, Ł. Ambroziński, P. Paćko, K. Dragan, T. Stepinski, T. Uhl: Artificial neural networks for damage classification based on Lamb-wave in aircraft's structures p. 15

M. Jurek, L. Ziemiański: Detection and localization of stress field concentration in CFRP panel p. 23

P. Nazarko, L. Ziemiański: Sensitivity and robustness of the novelty detection system in the aspect of elastic wave measurement accuracy p. 41

B. Meronk, K. Wilde: Cracks detection in concrete plates by ultrasonic waves modulated by low frequency oscillations p. 37

Closing ceremony

THE MAGNATE'S RESTAURANT

Lunch

Coffee break (Tylmanowska Gallery)

Bus tour and sightseeing Sandomierz

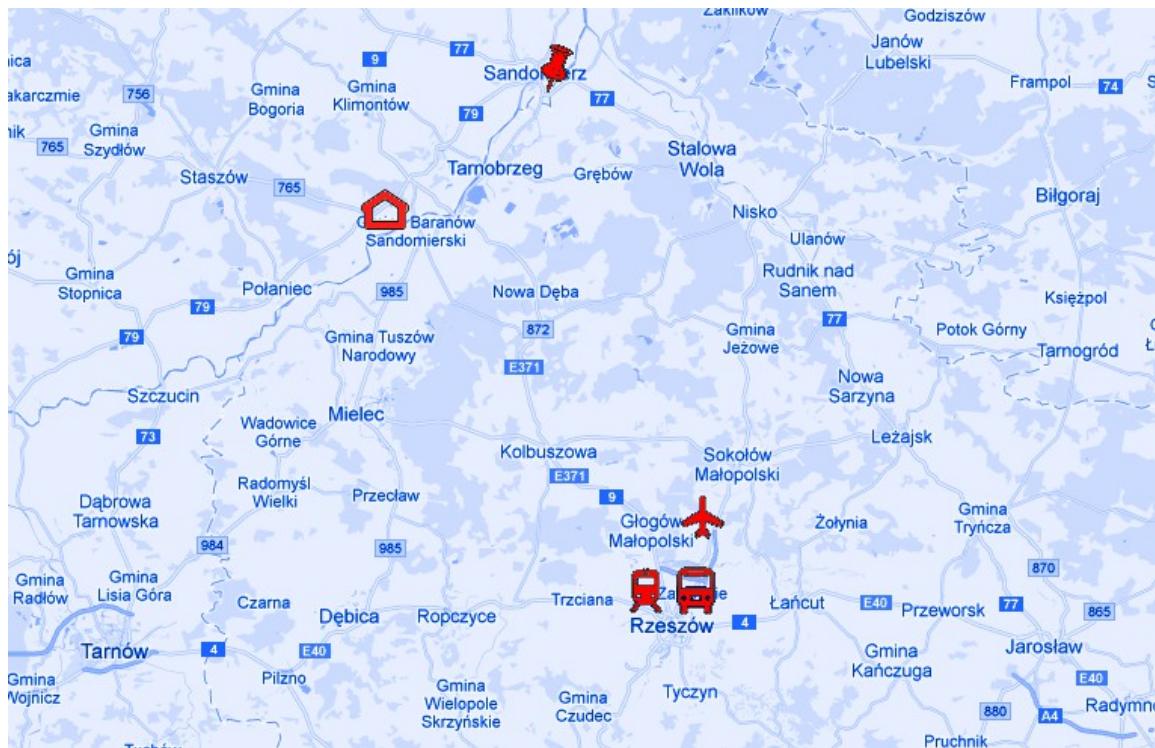
Dinner

Saturday, 27 April 2013

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Free time for individual tours and sightseeing

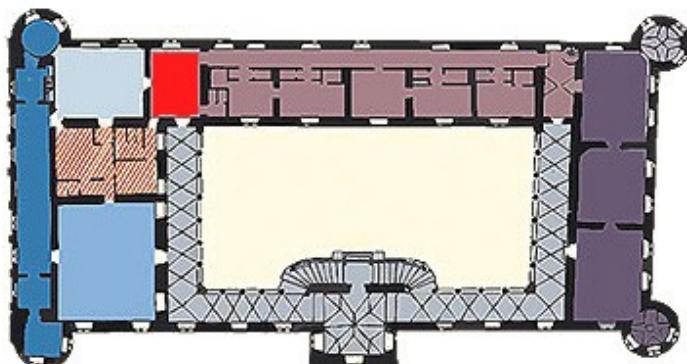
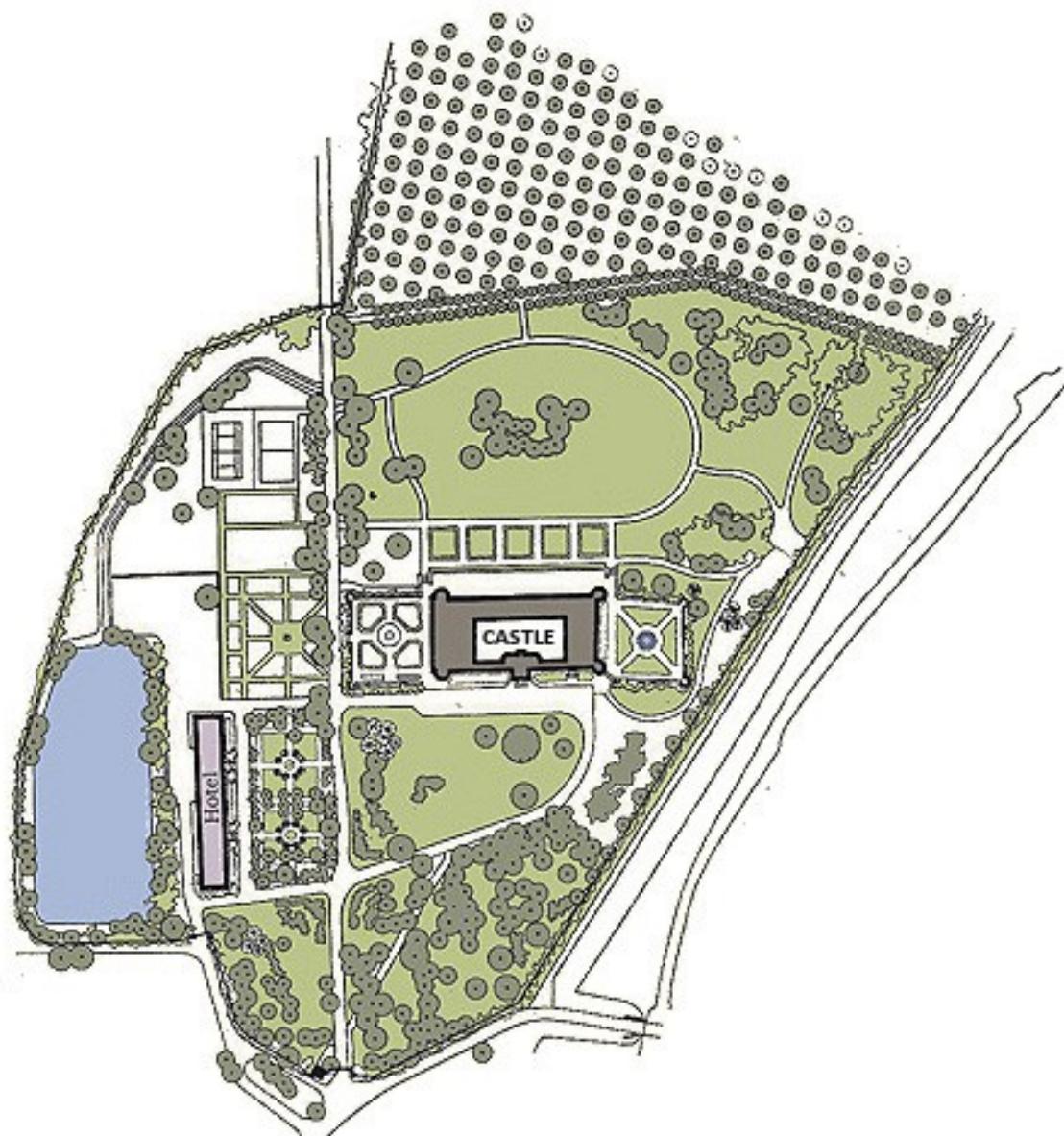
LOCATION OF THE CONFERENCE VENUE



LEGEND:

- Bus Terminal
- Train Station
- Rzeszow-Jasionka Airport
- IPM2013 Conference Venue
- Bus tour to Sandomierz

PLAN OF THE CONFERENCE VENUE



FIRST FLOOR

- PORTRAIT ROOM
- TYLMAŃSKA GALLERY
- COMMUNICATION ROUTE
- IPM2013 REGISTRATION

NOTES