

Papers published in this special issue have been presented during the International Conference on Inverse Problems in Engineering 2014 (ICIPE2014) which took place in Kraków, Poland, in May, 2014. The ICIPE2014 was the 24th in the series of national and international meetings on inverse problems that were initiated at Michigan State University in 1988. The 2014 edition is the 8th International Conference. Both the scientific committee members and the participants come from many countries worldwide: USA, Brazil, Russia, Poland and France, among others. The primary purpose of the Conference is to provide a forum of scientist and graduate students in sciences and engineering with recent results of the inverse problems.

The topics of the Conference cover inverse problems in all branches of science and engineering including thermal sciences, structure mechanics, fluid flows, medical applications and many others. This special issue of *Numerical Methods for Heat & Fluid Flow* (NMHFF) contains, however, only papers dealing with inverse thermal problems. During the Conference, six keynote lectures have been delivered by eminent scientists. These lectures were accompanied by presentations of 96 regular papers.

The issue contains 13 papers and presents few hot and important topics in inverse thermal analysis. One of them is the methodology to determine thermal properties like thermal diffusivity, thermal conductivity, emissivity coefficient, diffusion coefficient, etc. Together with the details of the estimation algorithms, the authors discuss particular problems occurring during experiments like problems of extremely small samples, non-destructive measurement of large block thermal conductivity made of anisotropic material, heating imposed either by a laser in the near-infrared range or by radiofrequency waves, determination of the thermophysical properties for a thin layer coating, etc.

Another important topic that is being dealt with in this special issue is how to formulate and solve inverse thermal problem for technically important industrial or medical processes. Just as an example, aluminum alloy welding, thermal insulation of a spacecraft, monitoring of transient thermal stresses, application of the proper orthogonal decomposition (POD) to determine wind loads on photovoltaic (PV) roof installation, hyperthermia treatment of cancer, ablation of cancer, etc.

The issue also contains papers coping with theoretical and computational aspects of the particular methods applicable to solving of inverse thermal problems like Tikhonov regularization method, Gaussian filtering technique, Markov Chain Monte Carlo, etc. One paper presents recent Russian contributions to the identification and modeling of inverse thermal processes.

We are indebted to all authors for their contributions to this special issue and for their cooperation and support. We do hope that this issue provides a window to the current interests in one branch of numerical heat transfer which is inverse thermal modeling. We would also like to thank Professor R.W. Lewis for giving us the opportunity to edit this special issue. We are also very grateful to the editorial staff of the *International Journal of Numerical Methods for Heat & Fluid Flow* (IJNMHFF) for the highly professional handling of this special issue.

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