Preface

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This special issue of the *Journal of Engineering Mathematics* results from a combination of driving forces in existence over the past few years. One main motivator was the recent tragic death on 16th April 2007 of Professor Liviu Librescu from Virginia Polytechnic Institute & State University (Blacksburg, Virginia, USA), a leader in the research and development of thermoelasticity. It is entirely appropriate that a Special Issue of the *Journal of Engineering Mathematics* be dedicated to honoring Liviu Librescu's memory.

Another motivator for the preparation of this issue was the strong desire to combine the independent, prima facie, theories of elasticity and heat conduction, and to provide analytical and numerical solutions of some advanced modern problems in thermoelasticity.

In recent decades, the thermoelasticity theory is the gathering force with new problems arising from modern requirements in design and construction of turbomachinery, jet and rocket engines, super-high-speed aircraft, nuclear reactors, etc. The great attention of researchers is provoked by the application of models and methods of the thermoelasticity theory for investigating the interaction between deformation and temperature fields, as well as a wide range of related fields, in solids with inhomogeneous micro- and macro-structure, which are widely adopted in different areas of current engineering.

The choice of the subject of this Special Issue is not accidental. In recent decades the thermomechanics of non-homogeneous structures has received strong inputs for its development. The great attention of researchers to these problems is stimulated by extremely fast technical progress. The wide usage in modern technological processes of novel non-homogeneous materials subjected to high temperature loads has generated new challenging problems. During their manufacturing and operating, structural members are subjected to different external perturbing factors (force and thermal loadings, acoustic and electro-magnetic fields, etc.). As a result of various physical processes, the structure (or some part of it) exhibits variable material properties due to defects in the structure. Coupled with deformation and non-uniform temperature fields, as well as hostile environments, these defects can put the structural

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member out of operation. For better accuracy in strength and reliability estimation, the mentioned effects must be taken into account at the development stage as well as during operation. When solving these problems, researchers need to create new complicated mathematical models and use sophisticated mathematical techniques. Such a combination of theoretical and applied aspects of problems is highly relevant within the scope of the *Journal of Engineering Mathematics*.

As Guest Editors for this Special Issue, we would like to record our thanks to all the authors for agreeing to contribute and for their patience in attending to the many revisions of their papers during the review process. We are grateful to Professor H. K. Kuiken (the Editor-in-Chief of the journal) for critically reading all the papers in this issue and his unfailing kindness in coming to our aid with valuable suggestions and advice.