

IUTAM Symposium on Asymptotics, Singularities and Homogenisation in
Problems of Mechanics

SOLID MECHANICS AND ITS APPLICATIONS

Volume 113

Series Editor: G.M.L. GLADWELL

*Department of Civil Engineering
University of Waterloo
Waterloo, Ontario, Canada N2L 3G1*

Aims and Scope of the Series

The fundamental questions arising in mechanics are: *Why?*, *How?*, and *How much?*

The aim of this series is to provide lucid accounts written by authoritative researchers giving vision and insight in answering these questions on the subject of mechanics as it relates to solids.

The scope of the series covers the entire spectrum of solid mechanics. Thus it includes the foundation of mechanics; variational formulations; computational mechanics; statics, kinematics and dynamics of rigid and elastic bodies; vibrations of solids and structures; dynamical systems and chaos; the theories of elasticity, plasticity and viscoelasticity; composite materials; rods, beams, shells and membranes; structural control and stability; soils, rocks and geomechanics; fracture; tribology; experimental mechanics; biomechanics and machine design.

The median level of presentation is the first year graduate student. Some texts are monographs defining the current state of the field; others are accessible to final year undergraduates; but essentially the emphasis is on readability and clarity.

For a list of related mechanics titles, see final pages.

IUTAM Symposium on
**Asymptotics,
Singularities and
Homogenisation in
Problems of Mechanics**

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A.B. MOVCHAN

University of Liverpool, United Kingdom

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PREFACE

This symposium was organised to provide cross-linking of research activities in the following areas of Applied Mathematics, Continuum Mechanics and Theoretical Physics:

- Perturbation problems for partial differential equations and their applications in mechanics;
- Homogenisation theory in models of composite structures;
- Fracture. Mathematical models of cracks in solids;
- Wave propagation, scattering;
- Models of photonic and phononic band gap composite materials;
- Models of dislocations in lattice structures;
- Asymptotic and numerical models of imperfect interfaces.

The topics covered in this volume represent the results of the recent work in wave propagation and scattering, asymptotics for eigenvalue problems, analysis of localised “defect modes”, mathematical models of cracks and damage in solids, homogenisation approximations and models of composites, models of plates and shells, analysis of physical fields near non-smooth boundaries, modelling of gas and fluid flows, non-linear waves, models of combustion and advanced numerical methods. All the papers included in this volume have been carefully refereed. The Appendix, at the end of the volume, includes the complete programme of the meeting.

The International Scientific Committee responsible for the Symposium comprised of the following: Prof. A.B. Movchan (UK) - Chairman, Prof. I.D. Abrahams (UK), Prof. A. Aslanyan (Russia), Prof. D. Bigoni (Italy), Prof. H. Gao (Germany/USA), Prof. K.Z. Markov (Bulgaria), Prof. R.C. McPhedran (Australia), Prof. J. Salencon (France), Prof. W. Wendland (Germany).

On behalf of the Scientific Committee, I would like to acknowledge the financial support for the Symposium from

- International Union of Theoretical and Applied Mechanics,

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- London Mathematical Society,
- Kluwer Academic Publishers,
- University of Liverpool.

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Alexander Movchan