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Foreword

The papers in this special issue are based on the Geomechanics Symposium held during the joint ASCE/ASME/SES Mechanics Conference in Northwestern University, Evanston from 29 June to 2 July 1997. The field of geomechanics has substantially matured over the past 30 years due to advances in computational mechanics and constitutive modeling. Its boundaries have expanded and all major topical areas cannot be covered in a single issue. The focus of this issue is on application of theoretical and computational methods for modern problems in geomechanics.

The first five papers are related to advances in analysis of dynamic soil–structure interaction. The paper by Guddati and Tassoulas presents an important development in the field of dynamic soil–structure interaction. These authors demonstrate a new algorithm to compute time domain response of layered media. The formulation of the thin layer method for solutions of point sources of various types is discussed by Kausel. Pak and Guzina present an alternative boundary integral equation based on full decomposition of Green's functions for problems involving multi-layered viscoelastic media. Barros and Mesquita Neto present analytical solutions for Green's function of orthotropic half-space and full-space problems. The efficient coupling of boundary and finite element methods for three dimensional dynamic soil–structure interaction problems are demonstrated by Coda and Venturini.

The next three papers cover topics in porous media. De Boer and Bluhm discuss the influence of compressibility of constituents of a porous medium on the stresses. Dynamic elasto–plastic behavior of porous media is analyzed by using the finite element method by Breuer and Jägering. Zhou, Rajapakse and Graham show application of a recently developed hygro-thermo-mechanical model for unsaturated media by considering several problems. The paper by Atkinson and Aparicio shows the applications and limitations of the invariants of energy momentum tensor for crack detection in two and three dimensions. Carbonell, Desroches and Detournay compare semi-analytical and numerical model for hydraulic fracture problems. The next three papers are related to advances in computational geomechanics. A finite deformation elasto–plastic model for pressure sensitive materials is presented by Jeremić, Runesson and Sture. Selvadurai and Sepehr study the interaction between a moving ice sheet and a flexible structure by using the discrete element method. The computational aspects of four elasto–plastic finite element algorithms are discussed by Wathugala and Pal. An application of function space concept is demonstrated by Chau to obtain Young's modulus of a rectangular solid compressed between two rough end blocks.

I would like to thank the Editor-in-Chief and the Associate Editor for their advice and cooperation. Acknowledgements are also made to the reviewers for their valuable comments. It is a pleasure to thank all contributors. I hope this collection of papers will stimulate further research in this important field.

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