

Preface

This book presents twenty-one invited contributions in the field of computational plasticity and related topics written by distinguished scientists on computational solid mechanics. The book has been conceived to honour Prof. Roger Owen on the occasion of his 75th birthday. The 21 technical chapters in the book are completed with a first chapter highlighting the scientific and technical contributions of Prof. Owen along his career, and, in particular his role in fostering the cooperation between the computational mechanics communities at the University of Swansea in Wales and the Technical University of Catalunya in Barcelona, Spain.

The release of the book has been chosen to be coincident with the 14th edition of the international conference on Computational Plasticity, Fundamentals and Applications (COMPLAS) held in Barcelona on 5–7 September 2017. The objectives of the COMPLAS conferences are to address both the theoretical bases for the solution of plasticity problems, the numerical algorithms necessary for efficient and robust computer implementation and present state-of-the-art applications of the numerical methods for solving practical problems in engineering. The COMPLAS conference series have been jointly organized since its start by the Swansea and Barcelona groups above mentioned.

Previous meetings in the COMPLAS series were held in Barcelona in 1987, 1989, 1992, 1995, 1997, 2000, 2003, 2005, 2007, 2009, 2011, 2013 and 2015. COMPLAS 2017 has been a special occasion as it is the 30th anniversary of the first COMPLAS conference held in 1987. The fourteen conferences in the series have been technically and academically successful, and the COMPLAS meetings have become established events in the field of computational solid mechanics.

The COMPLAS conferences are one of the Thematic Conferences of the European Community on Computational Methods in Applied Sciences (ECCOMAS). They are also Special Interest Conference of the International Association for Computational Mechanics (IACM).

A reason for the success of the COMPLAS conferences is that the ever increasing rate of development of new engineering materials required to meet advanced technological needs poses fresh challenges in the field of constitutive modelling. The complex behaviour of such materials demands a closer

interaction between numerical analysts and material scientists in order to produce thermodynamically consistent models which provide a response, while keeping with fundamental micromechanical principles and experimental observations. This necessity for collaboration is further highlighted by the continuing remarkable developments in computer hardware which makes the numerical simulation of complex deformation responses increasingly possible. Contributing to fostering and disseminating the advances in these challenging fields is the main objective of COMPLAS, and also a motivation for the publication of this book.

The 21 technical chapters in the book cover topics related to the History of Computational Plasticity, Advanced Material Models, Biomechanics, Composites, Contact Problems, Damage, Fracture and Fatigue, Forming Processes, Granulation Processes, High Velocity Impact, Industrial Applications, Innovative Computational Methods (FEM, Discrete Element Methods, Meshless Methods, Particle-based Methods, etc.), Multi-Fracturing Solids, Multi-Scale Material Models and High Performance Computing Techniques.

We would like to thank all authors by their contributions to this book. These contributions have been sent directly by the authors, and the editors cannot accept responsibility for any inaccuracies and opinions contained in the text.

Finally, we thank Prof. Owen for his many contributions to the field of computational mechanics and express our congratulations and best wishes on his 75 birthday.

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Swansea, UK
Swansea, UK
Barcelona, Spain
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Eugenio Oñate
Djordje Peric
Eduardo de Souza Neto
Michele Chiumenti

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Oñate, E.; Peric, D.; de Souza Neto, E.; Chiumenti, M.

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