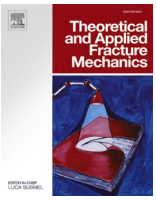
Theoretical and Applied Fracture Mechanics 127 (2023) 104046

Contents lists available at ScienceDirect

Theoretical and Applied Fracture Mechanics

journal homepage: www.elsevier.com/locate/tafmec



Editorial: Special issue on advances in computational fracture mechanics

In this special issue of Theoretical and Applied Fracture Mechanics, a number of papers is collected that give a comprehensive overview of Advances in Computational Fracture Mechanics. Many problems in fracture mechanics require numerical solution methods. Very often, numerical solutions are the only source of information for the analyst, but even if analytical or experimental solutions are available, numerical solutions provide further insight upon change of parameters and/or geometry. Thus, the development of numerical techniques that are applicable to and suitable for fracture problems remains a relevant and active area of research

One of the most fundamental questions that a modeller needs to consider is whether a crack is assumed to be *discrete*, either as part of the geometric description or through one or more discontinuous field variables, or *continuous*, captured via one or more degradation parameters that are included in the governing partial differential equations. The overview paper by de Borst outlines the most important differences between, and implications of, these two approaches.

A significant challenge in computational fracture mechanics is the resolution of the spatial discretisation required for a sufficiently accurate numerical solution. Interestingly, this applies equally to discrete and descriptions of cracks. Examples of the former are the contributions of R. Zhang et al., Garzon et al., Ci et al., and Ma et al, whereas the latter are demonstrated by Barbat et al., Doitrand et al., Li et al., Zhou and Feng, and Saberi et al.

The additional complexity of particular applications requires further development of the suite of numerical solution methods, as shown by Wen et al. and Mishra for Functionally Graded Materials, Rezaei et al. and B. Zhang et al. for Multi-Physics applications, and W. Zhang et al. for Multi-Scale phenomena. Finally, a novel trend in Computational Fracture Mechanics is the application of Machine Learning techniques, leading to progress in the estimation of model or test parameters, cf. the contributions of Fakhri et al. and Albaijan et al.

We trust that this special issue of interest and relevance for the wider research community of fracture mechanics, be they specialists or interested non-experts. We also hope that this collection of papers serves to inspire!

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https://doi.org/10.1016/j.tafmec.2023.104046

Available online 8 August 2023