

COMPUTATIONAL CHALLENGES OF EXTENDED CONTINUA

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ABSTRACT

Many important engineering and natural materials possess an underlying sub-scale structure that requires extended continuum descriptions to predict their response. This presents numerous computational challenges including, among others, the correct functional setting, implementation and efficiency issues, model and parameter identification, and verification and validation. Potential approaches include properly balanced ansatz spaces in Galerkin methods, collocation methods, automatic and symbolic differentiation, error estimation, adaptivity and parallelization, machine learning and inverse methods, and experimental data.

Given these challenges, the objective of the minisymposia is to share expert knowledge on recent developments in computational methods tailored to extended continua and thereby significantly advance the field.