

Diffuse-interface approaches for material modeling

Scientific area: Computational Solids And Structural Mechanics

Non-stationary interfaces are involved in a wide range of problems in continuum mechanics, including solid-solid phase transformations, grain growth, twinning, ferroelectric domain evolution, etc. Numerical modeling of materials undergoing such microstructure evolution has been an active area of research in the last two decades. The necessity to gain a deep understanding of the underlying mechanisms behind the microstructure formation and evolution and its corresponding effects on the overall mechanical behaviour of materials has driven an increasing development of computational methods. Chief among them, diffuse-interface approaches have been successfully applied to a large variety of micro/macro-scale problems involving non-stationary interfaces. With that in mind, the aim of this mini-symposium is to bring together researchers working on the development of diffuse-interface approaches, and to provide a platform to exchange opinions and experiences. Topics of interest cover material modeling at all relevant scales, including micro/meso-scale modeling by using the phase-field or level-set methods, and the phenomenological modeling at macro-scale, for instance, by using gradient-enhanced methods. Equally welcome are contributions concerning computational aspects and numerical algorithms pertaining to computer implementation and simulations involving the class of models mentioned above. Finally, papers discussing application-related and experimental aspects of the mechanics of materials of interest will complement the overview of the current research activities in the field.

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