Novel Approaches for the Multidimensional Convexification of Inelastic Variational Models for Fracture

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This talk presents innovative approaches to numerical multidimensional (semi) convexification of inelastic variational models, with a focus on the challenges posed by damage evolution. We present a hierarchical rank-one convexification framework that systematically relaxes variational problems, allowing more accurate and efficient computation of semi-convex envelopes. These envelopes will ultimately be integrated into fracture mechanics through coupling with erosion techniques. The discussion will focus on the theoretical development of this method and its implications for understanding and simulating the interactions between inelastic deformation and microstructure evolution, with particular emphasis on the problems posed by the latter.