Nonsmooth Problems with Applications in Mechanics
Olomouc, Czech Republic, May 19-23, 2025

Stochastic Models of Damaged Interfaces: A Numerical Study

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Abstract: Predicting damage in structures, particularly in composite structures, is essential to reduce the risk of failure. In this presentation, numerical strategies are presented to simulate the solid/solid interface behaviour, where a special attention will be paid to damage. Damage can occur at the scale of the volume of the material or at the scale of the interfaces between the materials that make up the structure. Damage is a highly complex phenomenon. In the work we are proposing, we consider the effect of the growth of micro-cracks at the micro-scale. Since this degradation is not totally predictable, uncertainties are introduced using the Itô integral. Secondly, two interface models are proposed. For this purpose, a technique of asymptotic developments is realised, allowing interface models to be derived from previous volume models. Finally, some numerical results obtained for academic examples will be presented, in order to understand the behaviour of the models and the influence of material parameters.