Efficient construction of probabilistic surrogate models describing irreversible material phenomena

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ABSTRACT

Uncertainty quantification of nonlinear systems in a spectral form is a challenging task mainly due to two reasons: spectral algorithms suffer from the curse of dimensionality and the classical polynomial chaos approximations fail to accurately describe states in a long time integration. On the other hand, the Monte Carlo simulations are often too time consuming to be used in practice. In this talk will be considered novel hybrid numerical approaches based on the adaptive sparse approximations. The special focus will be paid to the propagation of material uncertainties through (visco-)plastic and damage models mathematically described by the probabilistic variational inequalities.

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