Numerical approach to a rate-independent model of decohesion in laminated composites

Jan Zeman

Fakulta stavební ČVUT v Praze

In this contribution, we introduce an energy-based rate-independent formulation of decohesion processes in adhesively bonded assemblies such as laminated composites. The model itself is based on a variational formulation of isotropic, possibly non-associated, interfacial damage mechanics, in particular on the incremental minimization of the reversible and dissipated energy. Following the alternate minimization strategy introduced recently by Bourdin, the resulting optimization problem is discretized using the Finite Element Method and converted into its dual form based on the Finite Element Tearing and Interconnecting algorithm, extended to account for weakened interfaces. The numerical efficiency and robustness of the resulting algorithm is demonstrated by analyzing representative engineering benchmark tests. This is a joint work with Martin Kruzik and Pavel Gruber.