Cohesive modelling of delamination growth under mixed-mode loading conditions.

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Abstract A new cohesive model is proposed for the simulation of mixed mode delamination. The model is based on the physical observation that the failure of many interfaces is characterized by the competition between different mechanisms under dominant shear or tensile stresses, which is not usually taken explicitly into account in damage cohesive models. In the proposed cohesive model, internal friction is accounted for at the macroscale with a phenomenological approach, based on the definition of different damage modes. The strain energy release rate is decomposed based on its contribution to the three damage modes. The mixed-mode fracture energy is the result of the interaction among modes, without the need to define a priori an empirical law for its evolution with the mode-mixity.
The model has been validated by means of several delamination tests under both pure and mixed-mode loading conditions. In particular, application of the model to the simulation of several Mixed-Mode Bending (MMB) tests has been considered.