

Validation of an energy based peridynamic state-based failure criterion

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ABSTRACT

The paper presents a verification and validation approach for 2D peridynamic failure models. An enhanced energy-based failure model for state-based peridynamics developed by Willberg et al. [1, 2] is adapted for 2D. 3D reference solutions are used for verification. Two validation cases are considered. KIC tests of resin are used for validation, cf. Figure 1. The effects of the choice of boundary conditions, discretization and horizon on the result are studied. Scattering caused by the crack is also investigated in order to obtain a statement on the quality of the results. The second validation use case is a PMMA plate with a hole and crack, which is loaded under pressure [3]. The model is analyzed for different horizons and the effect of the boundary conditions is discussed. The results and models will be published openly. The model is implemented in the software Peridigm and is published open-source [4].

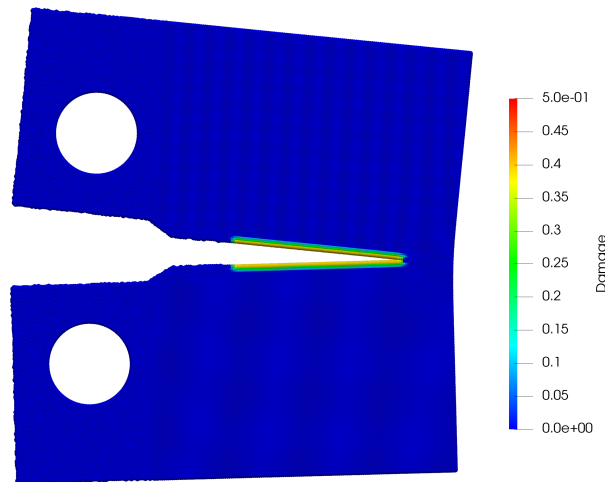


Figure 1: Crack of the KIC test

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