

Recent developments on dynamic fracture with peridynamics

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In a brittle material, a crack propagates rapidly and may curve or split into several branches, which results in various complex phenomena. Significant effort have been made to model damage and failure in a brittle material but classical models cannot be very useful except in special situations. Peridynamic models have been able to capture/reproduce many essential characteristics of dynamic brittle fracture observed in experiments; crack branching, crack-path instability, successive branching, secondary cracking, etc. The models have been applied in dynamic fracture and damage in isotropic materials as well as fiber-reinforced composites and even in multi-layered glass induced by high velocity impact. The simulation results have shown that the peridynamic formulation is reliable for modeling dynamic fracture without special criteria for crack initiation and propagation.

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