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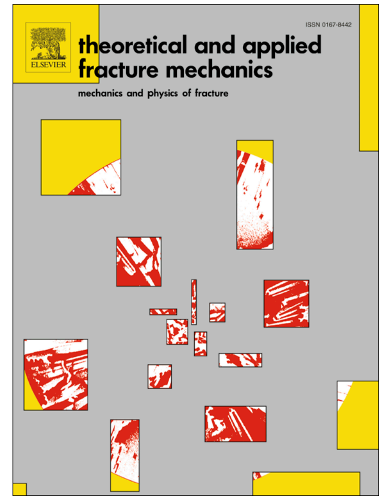


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# Mixed-mode dynamic stress intensity factors evaluation using ordinary state-based peridynamics

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**Abstract**

Mixed-mode dynamic stress intensity factors (DSIFs) for two-dimensional (2D) elastic cracked solids are evaluated employing ordinary state-based peridynamics (OSPD) theory. The interaction integral is adopted in the evaluation of the DSIFs. Because the displacement derivative cannot be evaluated in the standard OSPD theory, the derivative components in the interaction integral are derived based on the moving least-squares approximation (MLSA). In addition, the diffraction method is introduced in the MLSA to accurately evaluate the field variables around the crack. Several 2D mixed-mode crack problems are solved and evaluated DISFs for regular and irregular particle arrangements. High accuracy and path-independent mixed-mode DSIFs are achieved by this present formulation and discretization.

*Keywords:* Fracture Mechanics, Peridynamics, Dynamic Stress Intensity Factors, Moving Least-Squares

## 1. Introduction

In the last two decades, meshfree Galerkin methods have been developed for modeling in science and engineering research fields, and in particular fracture problems. In the meshfree formulation and discretization, particles are distributed entire the analysis domain and meshfree interpolants are employed for each particle to approximate field variables. The equilibrium equation for a continuum is transformed into weak form and is discretized using the scattered particles. The point of note is that fracture modeling, specifically, the displacement discontinuity along crack segment and the representa-