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An Axisymmetric Ordinary State-based Peridynamic Model for Linear Elastic Solids

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Abstract:

In this study, a new axisymmetric ordinary state-based peridynamic (PD) model for axisymmetric problems of linear elastic solids is presented. A fracture criterion based on the PD bond energy density is proposed. Adaptive dynamic relaxation (ADR) method is adopted to obtain equilibrium solutions, and a viable fictitious density of the model is derived and proven to be valid for implementation in the ADR method. Performance and validity of the proposed axisymmetric PD model are demonstrated by three kinds of numerical problems, i.e., compression test, pull-out deformation, and indentation fracture. In the compression test with focus on constant-strain deformation, the displacement predicted by the present model is compared with classical analytical solutions, and the results show good agreements. Both *m*-convergence and δ-convergence behaviors under four influence functions are investigated and discussed based on a thorough error analysis in different compression cases. The

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