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An Iterative Meshless Method for 2D Contact Problems Based on Radial Basis Functions

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Collocation-based meshless methods, and in particular the Kansa method, are increasingly adopted for the numerical solution of problems arising in physics and engineering. Their main advantage lies in the absence of a predefined mesh, allowing the solution to be constructed over a scattered set of nodes. This feature simplifies preprocessing, enhances flexibility in handling complex geometries, and enables straightforward evaluation of the solution at arbitrary locations within the domain. Moreover, meshless approaches are naturally suited for adaptive refinement and scalable implementations.
In this work, we propose an iterative computational framework for the solution of two-dimensional contact problems based on a meshless collocation scheme employing radial basis functions within the Kansa formulation. Contact phenomena are characterized by strong nonlinearities and inequality constraints, which pose significant challenges to conventional discretization techniques. The proposed approach addresses these issues through an iterative strategy designed to enforce contact conditions while preserving the flexibility and accuracy of the underlying meshless approximation.
The mathematical formulation of the method is first outlined, including the governing equations, the radial basis function approximation, and the treatment of boundary and contact conditions. The algorithmic structure of the iterative procedure is then described in general terms. Finally, the approach is applied to representative benchmark problems in two-dimensional elasticity. Preliminary numerical results are presented to illustrate the feasibility of the proposed method, and its performance is discussed in comparison with established numerical techniques.

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