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A continuum treatment of sliding in Eulerian simulations of solid-solid and solid-fluid interfaces[1] AKSHAY SUBRAMANIAM, NIRANJAN GHAISAS, SANJIVA LELE, Stanford Univ — A novel treatment of sliding is developed for use in an Eulerian framework for simulating elastic-plastic deformations of solids coupled with fluids. In this method, embedded interfacial boundary conditions for perfect sliding are imposed by enforcing the interface normal to be a principal direction of the Cauchy stress and appropriate consistency conditions ensure correct transmission and reflection of waves at the interface. This sliding treatment may be used either to simulate a solid-solid sliding interface or to incorporate an internal slip boundary condition at a solid-fluid interface. Sliding laws like the Coulomb friction law can also be incorporated with relative ease into this framework. Simulations of sliding interfaces are conducted using a 10^{th} order compact finite difference scheme and a Localized Artificial Diffusivity (LAD) scheme for shock and interface capturing. 1D and 2D simulations are used to assess the accuracy of the sliding treatment. The Richmyer-Meshkov instability between copper and aluminum is simulated with this sliding treatment as a demonstration test case.

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