

ELASTIC CONTACT WITH FRICTION

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We study different numerical models for simulating elastic contact with friction. Since the contact zone is unknown, and since there may be several elastic bodies involved, one part of this project is to define a method that simplifies the numerical integration of work being performed in the contact zone. To this end, we shall extend a recently proposed stabilization method for interface problems where the Lagrange multipliers (contact forces) are defined on a Cartesian mesh independent of the discretization of the elastic bodies. This is in general not a stable method, but with the new developed stabilization method, this problem is circumvented.

In a second approach, we shall investigate the possibility of using approaches from elastoplasticity of friction materials to the interface zone, avoiding the use of the standard Coloumb friction model and instead using Drucker-Prager-type material laws. This approach has recently been made possible through the work on discontinuous Galerkin methods.

In the figures, we show a numerical simulation of elastic contact with friction using a similar, but less computationally attractive, stabilized method.

