CONTACT BETWEEN A DEFORMABLE SOLID AND A FIXED RIGID WALL

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Abstract

Analysis of contact problems nowadays is very important for many mechanical applications. Despite the linearity of the elastic law, the contact problem is intrinsically nonlinear. Indeed, the surface of contact and contact forces are unknown and change gradually during different time steps.

We adapted the numerical scheme Mka3D in the 2D case (Mka2D) for space discretization of elastodynamics and used the MEMM scheme for numerical time-integration. The solid is discretized by a particle method (discrete element method).

The goal of this work is to obtain a first validation of the solid/solid contact to use it for the fluid/structure interaction. We have all our degree of freedom at time t, all our degree of freedom cells are fixed, we just have to solve our degree of freedom faces, which satisfy the nullity of the normal stress in case where there is no contact (Homogeneous Neumann), or which satisfy nonpenetration of the position in the contact case (solve a local problem).

Finally, we present a numerical simulation result between the Hertz’ disk with a plane rigid foundation.