

Seminar für Mechanik - Vortragsankündigung

Thema: **A dual mortar formulation for finite deformation frictional contact problems including wear and thermal coupling**

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Ort: Seminarraum Geb. 10.30, Erdgeschoss

Abstract:

The first part of the presentation will introduce a computational approach for the solution of structural frictional contact problems under finite deformations. The contact surface discretization is realized with the mortar method and contact constraints are enforced with the dual Lagrange multiplier method. This necessitates no regularization of contact conditions and allows for an efficient elimination of these additional unknowns from the global system of equations. The solution is realized with a semi-smooth Newton method where all nonlinearities are treated within one single iterative scheme which leads to a highly efficient solution algorithm in combination with the consistent linearization that is carried out.

The formulation is extended towards wear in the second part. This is performed using both an internal state variable and an Arbitrary Lagrangean-Eulerian formulation resolved with a fractional-step strategy. The latter one allows for significant material loss due to wear clearly changing the geometry.

The multiphysics problem of 3D thermomechanical contact is treated in the third part of the presentation. For contact conditions, here also the mortar method and dual Lagrange multipliers are applied. The monolithic solution scheme is directly embedded in the semi-smooth Newton method and shows, together with a consistent linearization of all contact related terms, an excellent convergence behavior.