

PARTICLES - BRIDGING THE GAP BETWEEN SOLIDS AND FLUIDS

Peter Eberhard

**Institute of Engineering and Computational Mechanics, University of Stuttgart, 70569 Stuttgart,
Germany**

E-mail: peter.eberhard@itm.uni-stuttgart.de

Particle methods have recently emerged as engineering tools that can be widely used in many different disciplines. Due to their meshless nature, they are especially well suited for problems with either many discrete bodies which can move independently or in problems with changing boundaries and topologies. Traditional discrete element approaches (DEM) can deal with millions of particles using appropriate interaction forces and efficient neighborhood search. However, these simulations are often not based on continuum mechanics based approaches and require a lot of heuristics and experience. On the other hand, approaches like Smoothed Particle Hydrodynamics (SPH) directly discretize and solve partial differential equations and can be used for both, simulating solids and/or fluids and even mixtures of both. Interestingly, DEM and SPH can efficiently share the same program environment. In this talk, besides an introduction to the main components of particle simulations, also many application examples from solids and fluids will be shown.

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