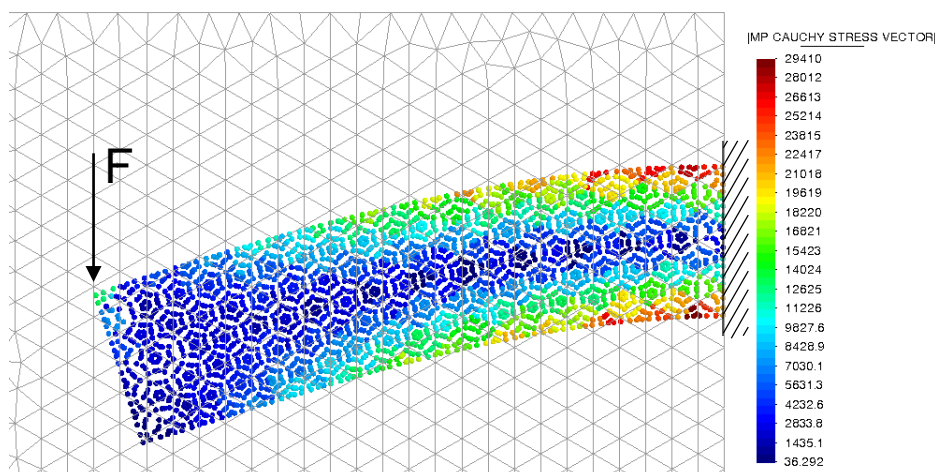


Masterarbeit:

GIMP element formulation for the Material Point Method

The Material Point Method is a continuum based particle discretization method. It discretizes the material into Lagrangian moving particles which are carrying all history dependent variables. The governing equations however are solved at a stationary background grid, which covers the complete computational domain. This dual discretization leads to the necessity of mapping data from the material points to the nodes of the background grid and vice versa, which defines the classical MPM procedure. However, as the material points can move through the background grid, they often cross cell boundaries which introduces a numerical noise in the standard MPM formulation, assuming linear shape functions for the displacement field. The Generalized Interpolation Material Point Method (GIMP) overcomes this issue, by modifying the respective shape functions nearby the element boundaries.



To start with this thesis a general literature review should be done to get familiar with the general workflow of MPM as well as the theory of GIMP. After the theoretical part, a new element formulation considering the shape functions of GIMP should be implemented into the open source Multiphysics platform KRATOS. Therefore basic programming experience in C++ and Python are essential for the proposed topic.

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Bearbeitungs-

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