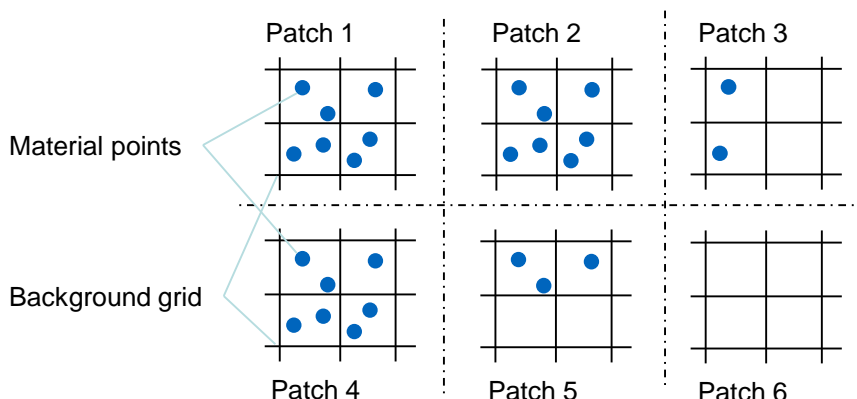


Masterarbeit:

The MPI parallelization of the Material Point Method

The Material Point Method is a continuum based particle discretization method. It discretizes the body 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. For the mpi parallelization of the MPM, the background grid is divided into several patches. However, as the material points can move through the grid, they may change their connectivity and thus may need to be sent to a neighboring partition. Therefore compared to FEM parallelization, the number of particles within each partition will change every time step and depending on the partition a lot of sending and receiving operations are necessary.



To start with this thesis a general literature review should be done to get familiar with the general workflow of MPM. Then the mpi parallelization of the current code should be reviewed, updated and validated for several examples. Furthermore the efficiency should be improved to equalize the computational effort.

Therefore deep programming experience in C++ and Python are essential for the proposed topic.

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Bearbeitungs-
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