

Projektarbeit

Comparison of codes for particle simulation

Reduction of drilling costs in the oil, gas and the geothermal industry is the main reason for high investments in researching this field. One important goal is to reduce the drilling time, i.e. increase the Rate of Penetration (ROP). One option for reaching this goal is to optimize the drilling process by utilization of realistic simulators. Software Simulators are used to model different aspects of the drilling process, e.g. Drilling, Fluid, Particle Transport etc. On the other hand, Hardware Simulators verify these models under realistic boundary and initial conditions.

At Drilling Simulator Celle (DSC), both hardware and software simulators are available to conduct the research and the experiments required in order to optimise the drilling process. One important research area is the transport of particles from the bottom hole to the surface. Detailed simulations are performed using the public version of the particle solver LIGGGHTS which is coupled by the public version of CFD coupling to OpenFOAM. However, there exist also other implementations, e.g., the PFM version from the Johannes Kepler University in Linz.

It is the goal of the project to give a comprehensive overview of the different implementations. functionality. The candidate should have a good knowledge of fluid mechanics. Knowledge in simulation technology especially in OpenFOAM and LIGGGHTS is beneficial but not mandatory.

The project is structured, as follows:

- Literature overview of different implementations
- Installation and familiarization with selected implementations
- Comparison of simulation results for test cases

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