

# Data-based soil-tool interaction force prediction based on measurements and the Discrete Element Method

*Thursday, July 30, 2020 1:00 PM (1 hour)*

We are interested in real-time capable simulation of soil and soil-tool interaction forces. In previous work, we have successfully implemented a solution of precomputing data using the Discrete Element Method (DEM) and efficiently processing and saving it in a lookup table. Within the respective online phase, the data is accessed in an efficient way [1,2].

We also perform measurements at a test pit at the soil laboratory at TUK with different kinds of soil, e.g. coarse gravel and coarse sand. We plan to use this data to include the frequency behavior in the reaction forces in order to improve the above mentioned approach. Interesting signal processing tools which may be used here comprise Fourier Transform, Power Spectral Density and others.

[1] Jahnke, J.; Steidel, S.; Burger, M. Soil Modeling with a DEM Lookup approach, PAMM, 2019

[2] Jahnke, J.; Steidel, S.; Burger, M.; Simeon, B. Efficient Particle Simulation Using a Two-Phase DEM-Lookup Approach, Proceedings of the 9th ECCOMAS on MBD, pp. 425-432, 2020

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