Master Thesis
Modelling of a layered half space with cylindrical excavation using the Integral-Transformation-Method (ITM)

Motivation:
The numerical investigation of railway induced enviromental vibrations has received considerable attention in the past years. The passage of vehicles over uneven tracks generates elastodynamic waves that propagate through the soil leading to vibrations at the soil surface and also to structural vibrations in nearby buildings.

The wave propagation in an infinite elastic half space can be solved analytically using the Integral-Transformation-Method (ITM). Fundamental solution for systems like a halfspace or a fullspace with cylindrical cavity were derived in literature. By superposing those fundamental systems also solutions for more complex geometries can be obtained.

Tasks:
In the scope of this thesis the already existing solutions for a fullspace with cylindrical cavity and a half space (implemented in a Matlab code of the chair) shall be superposed in order to model a single layer with a cylindrical excavation. This system shall then be coupled to the fundamental system of a half space using the substructure technique.

Finally the vibrations at the surface due to dynamic excitation within the tunnel placed in the layer (e.g. by a passing subway) shall be evaluated.

The thesis can be written in either English or German.

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Literature: