*Master Thesis*

Numerical modeling of jointed rock masses with interface elements

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Background: The presence of foliation and joints in rock masses can lead to an anisotropic behavior of a rock mass, when a tunnel is excavated in it. To take into

account the rock mass behavior and its interaction with the structure, an appropriate modeling of the system has to be performed considering the planes of weakness in the rock.

In this thesis, the focus is posed on the implementation of the interface behavior between rock layers to perform failure analyses of rock wedges and the analysis of sliding of rock portions along the joints.
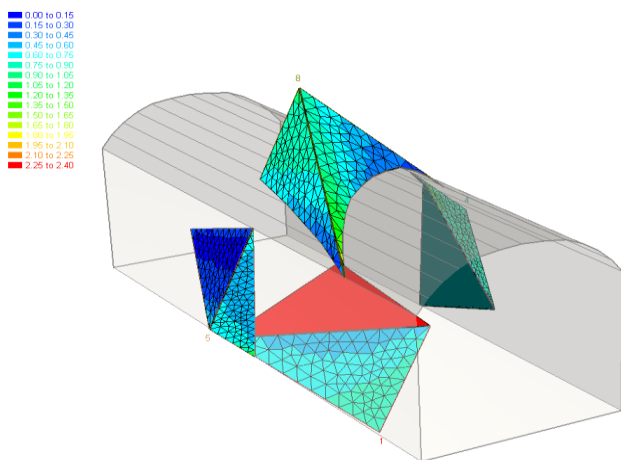
Tasks:

- Understanding the theory behind constitutive models used for jointed rock, the theory behind interface elements and their implementation in an object oriented finite element software; additional literature review on the topic.

- Implementation of a utility for the automatic generation of potential failure planes, and implementation of a constitutive law for the joints to reproduce the anisotropic rock behavior in the software Kratos Multiphysics.

- Modeling of 3D rock detachments in an underground cavern and model validation.

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