

Graz University of Technology  
Institute for Rock Mechanics and Tunnelling

# Master Thesis (MA, 30 ECTS)

**Analysis and decomposition of high resolution landslide monitoring data**

## Description

An active landslide in the proximity of a pumped storage power plant represents a highly complex, dynamic system. Gravitation, water level changes and precipitation are considered to be the main driving factors and detected movement rates and deformations are the result. Because of the possibility of a sudden failure and the resulting flood wave, these landslides are usually under constant observation to detect failure as soon as possible.

Following a finished PhD thesis, this study deals with several high-resolution datasets of such a landslide: chain inclinometer data, geodetic measurement points, pore water pressure gauges, reservoir water level monitoring data, precipitation data. Due to the big quantity of the data, visual / manual analysis is cumbersome, error prone and inefficient. Therefore, the first goal of this thesis is to analyze and visualize the data, by deploying basic statistical- and machine learning techniques (data distribution, correlation analysis, scatter-, line-, histogram plots...).

The second step is to decompose the individual datasets into their components (i.e. dividing time series into a trend, a cyclical-, a seasonal- and an irregular component). This aims at acquiring a deeper understanding of the driving mechanisms of this landslides and should show if observed movement rates are connected to a superimposition of different driving factors.

Due to the big amount of data, the analysis will require skills beyond MS Excel. Programming skills (Python) are recommended but can also be acquired during the thesis (additional efforts for this shall be considered).

The study will be done in close cooperation with the Institute of Soil Mechanics and Foundation Engineering.

**Start:** April 2019

**Duration:** ca. 6months

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