# Optimisation of material parameters using python

✓ **Bachelor- / Studien- / Masterarbeit**

In solid mechanics the mechanical behaviour of biological tissue but also composite materials are described by mathematical functions. For hyperelastic materials stresses are derived from a so called strain energy function, which incorporate material parameters to capture the characteristic material behaviour observed during experimental testing. Besides (linear and non-linear) elastic material behaviour, materials also exhibit inelastic material properties such as plastic deformation and damage. In order to obtain a set of suitable material parameters to describe the elastic and inelastic material properties, optimisation algorithms are embedded in the theoretical analysis.
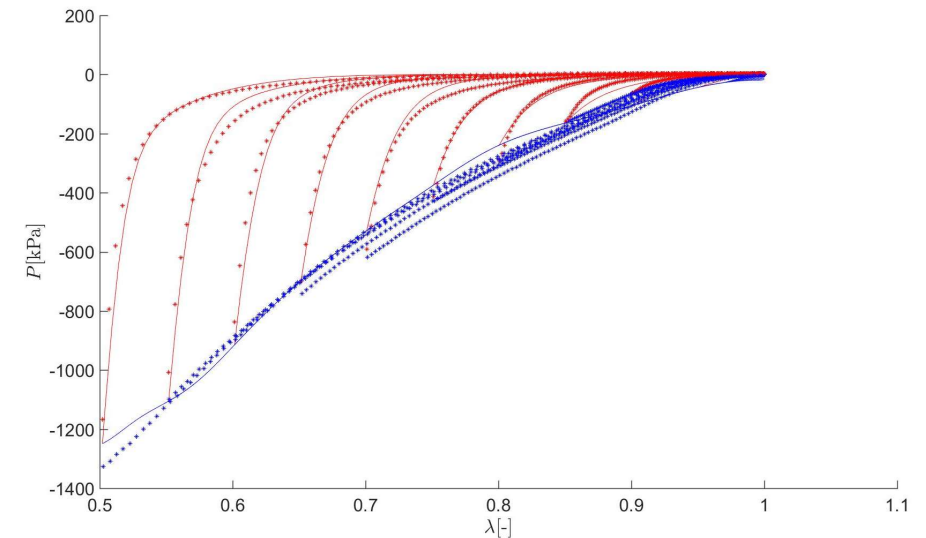
Experimental data from Böl et. al, „ A phenomenological model for the inelastic stress-strain response of a potato tuber", 2019

Possible Tasks:

- Implementation of strain energy functions with a varying number of material parameters

- Extending the kinematic description to visco-elastic / elastic-plastic deformations

- Apply different optimisation algorithms to solve the optimisation problem

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