

# Oberseminar Nichtlineare Differentialgleichungen

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## Some variational problem in morphoelasticity

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Abstract: I will present some recent work in collaboration with Elisa Davoli (TU Wien) and Ulisse Stefanelli (University of Vienna) on a three-dimensional quasistatic morphoelastic model. The mechanical response of the body and its growth are modeled by the interplay of hyperelastic energy minimization and growth dynamics. An existence result is obtained by regularization and time-discretization, also taking advantage of an exponential-update scheme. Then, we allow the growth dynamics to depend on an additional scalar field describing a nutrient, and formulate an optimal control problem. Eventually, we tackle the existence of coupled morphoelastic and nutrient solutions, when the latter is allowed to diffuse and interact with the growing body.

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