

## Seminar im Rahmen des GRK 2078

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Nonlinear Optimization, University of Duisburg-Essen  
(joint work with C. Meyer and A. Rösch)

Datum: Mo., 07.05.2018  
Uhrzeit: 14:00 Uhr

Ort: Geb. 10.23, 3. OG (R 308.1 – KM-Seminarraum)

Titel: **Optimal control of mechanical damage processes**

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### Abstract

In this talk a numerical solution method for an optimal control problem of a specific viscous two-field gradient damage model will be presented. The mechanical damage model features two damage variables which are coupled by a penalty term in the gradient enhanced free energy functional. The minimization of the free energy as well as the consideration of the evolution of the damage in time result in state equations which are nonlinear and nonsmooth in general. Therefore, necessary optimality conditions are difficult to obtain.

Under certain assumptions it is possible to derive an approximate gradient which is used to apply a gradient based optimization algorithm. We focus on solving the discretized problem and present supporting test results.

### References

- [1] B. Dimitrijevic and K. Hackl. A method for gradient enhancement of continuum damage models. *Technische Mechanik*, 28(1):43-52, 2008.
- [2] C. Meyer and L. Susu. Analysis of a viscous two-field gradient damage model, part 1: Existence and uniqueness. Technical Report 526, *Ergebnisberichte des Instituts für Angewandte Mathematik*, TU Dortmund, 2015.

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Alle Interessenten sind herzlich eingeladen.  
Prof. Dr.-Ing. Thomas Böhlke