Advances in Computational Mechanics

Einladung zum Vortrag

A variational growth approach to topology optimization

Dr.-Ing. Philipp Junker
Ruhr-Universität Bochum
Lehrstuhl für Mechanik - Materialtheorie

This talk begins with an introduction to variational modeling principles before a new approach to topology optimization is presented. It is based on observations of natural biological systems in which growth processes are initialized during high mechanical loading. A compliance parameter is introduced that serves as an internal variable and for which evolution equations are derived using different variation principles. The well-known problem of checkerboarding is faced with regularization techniques on the Helmholtz free energy. The final procedure uses only the Helmholtz free energy as input. Several numerical examples are given for demonstration purposes.

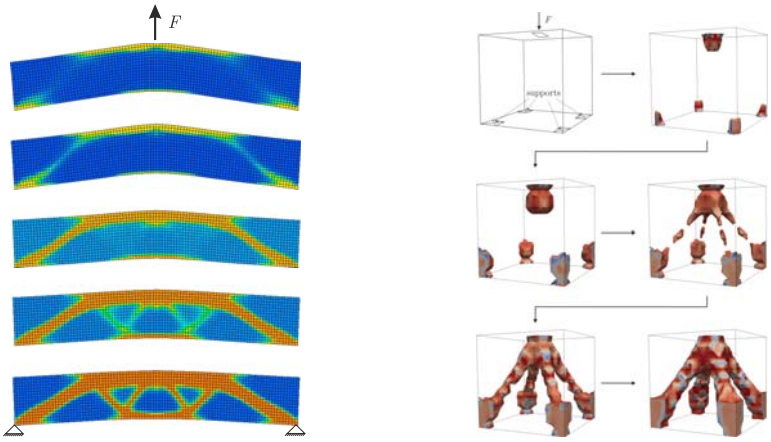

Figure 1: Evolving optimized mass distribution for the simply supported beam (left) and a cube under tension (right) for several points in time.

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Lehrstuhl für Numerische Mechanik • Prof. Dr.-Ing. W. A. Wall • TU München
Boltzmannstr. 15 • 85747 Garching b. München • Tel 089-289-15300
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