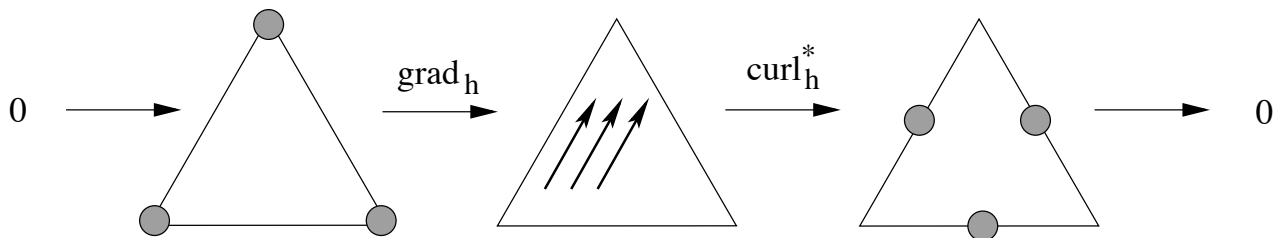# Finite element exterior calculus, homological techniques, and applications to elasticity

Seminar WS 2009/2010

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$$0 \longrightarrow \triangle \xrightarrow{\ \text{grad}_h\ } \triangle \xrightarrow{\ \text{curl}_h^*\ } \triangle \longrightarrow 0$$

The aim of this seminar is to study the recently developed *Finite Element Exterior Calculus*, which brings together ideas and techniques from finite element analysis, differential geometry, algebraic topology, and partial differential equations.

This new unifying view makes an entire zoo of finite elements more accessible and leads to a deeper mathematical understanding. In particular, it yields a simplified treatment of discretizations in elasticity and paves the way for the construction of new stable high order finite elements.

We invite students at the advanced master/diploma or PhD level to participate. In particular, we invite students that are interested/working in one of the following fields: numerical analysis, differential geometry, algebraic topology, or partial differential equations.

The seminar will mainly follow the text "Finite element exterior calculus, homological techniques, and applications" by Arnold, Falk, and Winther, Acta Numerica (2006), pp. 1–155.

Preliminary meeting: October 1st, 14:00, Besprechungszimmer (room 111, 1st floor), Inst. f. Numerische und Angewandte Mathematik, Lotzestr. 16-18