Kolloquium Angewandte Mathematik Prof. Thomas Apel (BAU1) Prof. Matthias Gerdts (LRT1) Prof. Markus Klein (LRT1)



## Vortragsankündigung

Am Donnerstag, den 05.12.2024, hält um 17:00 Uhr

Prof. Dr. Serge Nicaise (Université Polytechnique Hauts-de-France)

einen Vortrag über das Thema

## A posteriori goal-oriented error estimators based on equilbrated flux and potential reconstructions

Der Vortrag findet im Raum 1431 in Gebäude 33 statt.

## Vortragszusammenfassung

Many engineering problems require the calculation of certain quantities of interest, which are usually defined by linear functionals depending on the solution of a partial differential equation. Examples include the local or global mean value of a temperature, or the magnetic flux density at a given point of an electromagnetic device. In this talk, we focus on estimating the error of such functionals using a wide variety of numerical methods (finite elements, discontinuous galerkin and finite volumes), within a unified framework for elliptic and parabolic problems. The key point lies in solving a dual problem and using guaranteed equilibrated estimators for the primal and the dual problems, computed using flux and potential reconstructions. In all cases, we prove that the goal-oriented error can be split into a fully computable estimator and a remainder term that can be bounded above by computable energy-based estimators. We present some numerical tests to underline the capability of this goal-oriented estimator in different contexts : reaction-diffusion problems, heat equation, and harmonic formulation of eddy-current problems.

These results are based on joint works with Emmanuel Creusé (DMATHS, CERAMATHS, Université Polytechnique Hauts-de-France) and Zuqi Tang (L2EP, Université Lille).

## Alle Interessierten sind dazu herzlich eingeladen.