Tutorial

deal.II finite element library

Professor Guido Kanschat, Texas A&M University

Monday, October 11 and Wednesday, October 13

2:00 pm – 5:00 pm each day

Conference Room 305 and 4th Floor Computer area

In the **first part** I will introduce deal.II and discuss its capabilities and limitation. I will give an overview of the development paradigms of the library and present the structure of a typical application based on it in order to address the question whether deal.II is the right tool for your purposes or not.

The **second part** of the tutorial focuses on the implementation of basic model problems, following the first six steps of the online tutorial. Starting with generating and refining simple meshes (step 1), we move on to solving Poisson's equation (step 3). We modify the program to study how to use different finite elements, solvers and to implement other bilinear forms. We wrap up by introducing techniques for dimension independent programming, adaptive iterations and multilevel methods.

The **tutorial closes** with the discussion of more advanced applications. We study the handling of systems of equations at hand of the Lame-Navier equations of elasticity, the (linear) Darcy equations for porous media flow, and the Stokes equations. Participants are welcome to suggest additional applications (possibly in advance). The tutorial is open-ended and we can continue working on projects during the next months.

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Sign-up sheet for ‘hands on’ session