Graz University of Technology

IGTE - Institut für Grundlagen und Theorie der Elektrotechnik

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Graz, 09. März 2023

Sehr geehrte Damen und Herren,

hiermit ergeht die Einladung des Instituts für Grundlagen und Theorie der Elektrotechnik mit der Bitte um ggf. Weitergabe in Ihrem Bereich:

GASTVORTRAG von Peter Münch

am **Montag, 20.03.2023** um **16:00 Uhr**, Hörsaal i 5, Inffeldgasse 25/D 1 OG und Online

https://tube.tugraz.at/paella/ui/live.html?stream=da6553af-d0a6-499b-9b32-6cd8ef244d96

Title:
Matrix-free finite-element computations in deal.II

Abstract:
Matrix-free finite element methods have gained a lot of attention in the last decade due to their suitability for modern CPU- and GPU-based systems in contrast to the matrix-based alternatives. By now, a number of open-source libraries, like deal.II, DUNE, MFEM, Firedrake, offer matrix-free support. Nevertheless, matrix-free computations are still a niche topic and not the first choice by users, particularly, during rapid prototyping.

In my presentation, a brief introduction into the open-source finite-element library deal.II with special focus on matrix-free infrastructure will be presented. Next, different projects ranging from fluid and solid mechanics to computational plasma physics and additive manufacturing will be presented, which have successfully adopted matrix-free methods, and by discussing the extension of matrix-free algorithms to non-matching meshes.

Peter Münch ist wissenschaftlicher Mitarbeiter am Lehrstuhl für Wissenschaftliches Rechnen der Universität Augsburg und einer der Hauptentwickler der Open-Source Software deal.II (https://www.dealii.org/).