

Seminář aplikované matematiky

prof. Dr. Peter Arbenz

ETH Curych, IT4Innovations

On compact finite difference methods for the Poisson equation

**3. září 2020
od 12:30 hodin
na EA 553
FEI, VŠB – TU Ostrava**

Abstrakt: The method of finite differences is well known for solving PDE's on axis-parallel domains. In particular, the central 5- and 7-point stencils are standard for solving the Poisson equation in two and three dimensional problems. These methods have only second order accuracy, though. Stencils with more points than the standard stencils can be derived that lead to methods with higher orders of accuracy. In the method of "compact" finite differences only the neighboring points of the stencil center are employed. I will show how forth order accuracy is achieved in two and three dimensions. The resulting linear systems have more nonzero entries than those obtained with standard finite differences. However, if FFT techniques are applicable as in Fast Poisson solvers then it turns out that solvers for compact and standard difference schemes have equal complexity.