

Srdečně zveme pracovníky KMD, KAP a další zájemce z řad veřejnosti na přednášku pořádanou v rámci odborného semináře *KO-MIX*

# A General Software Framework for Algebraic Multigrid Methods

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### Abstrakt přednášky:

Algebraic multigrid methods (AMG) represent a popular class of “black-box” solvers and preconditioners for large and sparse linear algebraic systems arising mainly from discretised partial differential equations. Various algorithms and software packages implementing them exist nowadays differing essentially in the way how the coarsening process on the fine levels is realised and how the transfer operators are constructed. On the other hand, several AMG features can be shared including smoothers, coarse-grid solvers, and definitions of multilevel cycles. One drawback of the existing AMG packages is due to their focus on a single type of the AMG algorithm (e.g., classical AMG, aggregation, smoothed aggregation).

We propose a simple object oriented interface based on TRILINOS which allows to implement essentially any kind of AMG approach in a single framework. Its core uses a hierarchy of factory-like objects which are responsible for creating level components of various types including coarsening objects (e.g., C/F splittings, aggregations), transfer operators, coarse level matrices, smoothers, solvers, elementary recursive cycles etc. The focus is mainly on the ease of extension of the implemented algorithms (simply by subclassing a component of a given type and redefining a single factory method) and, in addition, on the possibility to reuse partially the multigrid hierarchy when solving sequences of linear systems (e.g., from non-stationary and/or non-linear problems).

In the experimental part, we illustrate the use of the interface and the performance on some academic problems as well as on practical problems arising in reservoir simulations.

Za organizátory semináře srdečně zve

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