

TITLE:

Radial Basis Functions for Solving PDEs - Some Recent Developments

ABSTRACT:

In the context of solving PDEs, RBFs provide a major generalization of pseudospectral (PS) methods. Collocation with RBFs typically also provide spectral accuracy but, in contrast to PS methods, RBFs can be applied also on highly irregular domains and can easily be combined with local node refinement. This presentation will be focused on three different issues relating to these observations:

- (i) Nearly flat (or completely flat) radial basis functions: Why are these interesting, and how can they be utilized in computationally stable ways (i.e. without running into any numerical ill-conditioning issues),
- (ii) The Runge phenomenon in the context of RBFs, and
- (iii) The numerical solution of PDEs in spherical geometries: Comparisons against the main approaches that are used in the weather- and climate modeling communities.