

MATHEMATISCHES FORSCHUNGSINSTITUT OBERWOLFACH

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Computational Engineering

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ABSTRACT. The focus of this Computational Engineering Workshop was on the mathematical foundation of state-of-the-art and emerging finite element methods in engineering analysis. The 52 participants included mathematicians and engineers with shared interest on discontinuous Galerkin or Petrov-Galerkin methods and other generalized nonconforming or mixed finite element methods.

Mathematics Subject Classification (2010): 65K15, 65N15, 65N25, 65N30, 65N50, 65N55, 74B05, 74B20, 74G15, 74S05.

Introduction by the Organisers

This Computational Engineering Workshop at Oberwolfach focused on mathematical and numerical aspects of emerging methodologies in mixed and nonstandard finite element methods and their applications in computational engineering. This large class of numerical methods included adaptive methods, classical nonconforming methods, h-p finite element methods, discontinuous Galerkin methods, discontinuous Petrov-Galerkin methods, generalized finite element methods, mixed and hybrid methods, multiscale methods, virtual finite element methods, kinetic methods, mortar methods, mapped tent-pitching methods and the finite cell method.

Application areas included electromagnetics, solid mechanics, fluid dynamics and optimal control.

Thirty three talks were given during the main part of the workshop. A special Thursday evening “After Dinner Special” was also held, which highlighted the research of some of the younger participants.

The workshop continued the older tradition of fruitful interactions of applied mathematics and computational engineering at Oberwolfach with rewarding outcomes like the Priority Program 1748 “Reliable simulation techniques in solid mechanics. Development of non-standard discretization methods, mechanical and mathematical analysis” of the German Research Foundation.

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