

HIGH ORDER NUMERICAL METHODS AND HIGH ORDER MESH GENERATION

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ABSTRACT

It has been known that the pre-processing of low order schemes accounts for about 80% of the overall analysis time and has become a major bottle-neck of modern engineering. The high order schemes seem to draw much more attention than ever before due to their superior properties and fast development in recent decades. The proposal of the isogeometric analyses (IGA) concept was also inspired by the hierarchical finite element method (HFEM). Early high order methods are known as the p -version methods, of which the typical one is the HFEM in solid mechanics or the spectral element method (SEM) in fluid mechanics. Other high order methods that developed very fast in recent decades include the discontinuous Galerkin methods (DGM), the mesh free methods (MFM), the differential quadrature method (DQM), etc. With the fast development of high order schemes, the absence of high order mesh generator becomes a major obstacle preventing the widespread applications of high-order methods. Thus, the investigation on this field is also growing fast in the past decade.

On this context, this minisymposium expects to get scholars around the world together to discuss the development of a method of seamless integration of CAD and CAE through directly integrating the surface trimming techniques (geometry) and topologies of CAD with the p -version methods of CAE. The topics of this minisymposium include but are not limited to: (1) High order methods like IGA, HFEM, SEM, DGM, MFM, DQM, etc. (2) Mesh generation methods (both low order and high order, both structured and unstructured). (3) Seamless integration of CAD and CAE. (4) Applications of high order methods.

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