

数学与系统科学研究院

计算数学所学术报告

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报告题目:

**Innovative finite element
technologies applied to reservoir
simulation**

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311 报告厅

Abstract:

The innovative finite element technologies considered in the present talk have been developed and implemented by the research group at LabMeC within NeoPZ1, an open-source object-oriented computational environment. NeoPZ already incorporates a variety of element geometries (in one, two and three dimensions), variational formulations, and approximation spaces. In addition to the usual conforming (H_1 , $H(\text{div})$, $H(\text{curl})$), non-conforming spaces (discontinuous, hybrid), and spaces spanned by reduced basis can be used as well. The users of NeoPZ can implement arbitrary high order approximations, and apply hp-strategies, without limitations on hanging sides and distribution of approximation orders. NeoPZ is integrated with pthreads and thread building blocks for efficient execution on multi core computers.

The present goal is to incorporate these technologies in a reservoir simulator. For instance, recent results concerning innovative mixed formulations based on curvilinear hp-adaptive meshes and using static condensation shall be presented. Furthermore, new developments shall be described: towards the combination of different element geometries or variational formulations in a single mesh; allowing the coupling of phenomena of different dimensions (e.g., well 2D, reservoir 3D); multiphysics simulations (in order to contemplate coupling of different phenomena, e.g. geo-mechanics, geo-thermic); efficient iterative solvers; and a multi-scale approach.

欢迎大家参加！