青年学术论坛邀请报告

报告人

Prof. Luca Dede (Politecnico di Milano, Italy)

报告人简介：

Dr. Luca Dede is currently an assistant professor at MOX, Mathematics Department of Politecnico di Milano in Italy. He received PhD degree in Politecnico di Milano and worked there as a postdoc. Then he became a postdoc in the University of Texas at Austin and later become a lecturer at EPFL in Switzerland. His main research interests include optimal control, reduced order modelling, computational fluid dynamics and isogeometric analysis.

报告时间地点

2017年7月13日（周四）10:00--11:00
闵行数学楼401报告厅

报告类型：

计算数学

报告题目：

Computational fluid dynamics of the heart: from integrated cardiac models to numerical modeling of blood flows

报告内容简介：
The simulation of the blood flow in the heart represents a challenging task from both the mathematical and numerical modeling points of view. This is due to the strong interaction of the different heart components, the variability of the blood flow regimes occurring during the heartbeat, and the interaction with the valves. Specifically, the blood flow in the heart chambers is driven by the muscle contraction and relaxation, as well as by its interaction with the valves.

In this talk, we discuss the mathematical and numerical aspects of integrated heart models, including the electrophysiology and mechanical activation, with the focus being on the numerical modeling of the fluid dynamics. We consider a Variational Multiscale formulation of the Navier-Stokes equations to model turbulence in the heart chambers. We numerically simulate blood flows in idealized left ventricles and left atria, as well as patient-specific configurations; we propose and discuss the treatment of heart valves as mixed time varying boundary conditions of the Navier-Stokes equations or through the resistive method. Also, we present a reduced 3D-0D model for the simulation of the blood flow through the aortic valve, which is based on moving resistive immersed implicit surfaces; finally, we discuss the numerical results obtained for a patient-specific aortic valve model.

主持人：朱升峰副教授

