数学与系统科学研究院

计算数学所学术报告

报告人：　Prof. Sijun Zhang

（ Technical Fellow, ESI CFD Inc., Huntsville, Alabama, USA, and Adjunct Professor, Beihang University ）

报告题目：

Development of an Aeroelastic Modeling Capability for Transient Nozzle Side Load Analysis

邀请人：　袁礼 研究员

报告时间：2014 年 12 月 22 日（周一）

下午 16:00-17:00

报告地点：　数学院南楼九层 902 会议室

Abstract:

Lateral nozzle forces are known to cause severe structural damage to any new rocket engine during test. While three-dimensional, transient, turbulent, chemically reacting computational fluid dynamics (CFD) methodology has been demonstrated to capture major side load physics with rigid nozzles, hot-fire tests often show nozzle structure deformation during major side load events, leading to structural damages if structural strengthening measures were not taken. The modeling picture is incomplete without the capability to address the two-way responses between the structure and the fluid. The objective of this study is to develop a coupled aeroelastic modeling capability by implementing the necessary structural dynamics component into an anchored CFD methodology. The CFD component is based on an unstructured-grid, pressure-based formulation, while the computational structural dynamics component is developed in the framework of modal analysis. Transient aeroelastic nozzle startup analyses of the Block I Space Shuttle Main Engine at sea level were performed. The computed results from the aeroelastic nozzle modeling are presented.

Keywords: Computational Fluid-Structural Interaction, Higher Order Schemes for Unstructured Meshes.

报告人简介:

Sijun Zhang (张思军), Technical Fellow-CFD/Aerospace of ESI CFD Inc. at Alabama USA, and adjunct Professor at Department of Human-Machine-Environmental System Engineering, Beihang University. He received his PhD from Beihang University in 1993, conducted post-doctoral research in Institute of Process Engineering, Chinese Academy of Sciences in 1993-95. He has worked with CFDRC and later ESI CFD since 2000. He has been active in various CFD developments like Multi-Phase Flow, Overset Grid, Adaptive and Parallel Computing. He is also an invited foreign expert in several aircraft research institutes in Aviation Industry Corporation of China.

欢迎大家参加！