A short course on

Multiscale Finite Element Methods and Applications

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COURSE OUTLINE

1. **Introduction**

2. **Multiscale   Finite Element Methods**

3. **Convergence analysis**

4. **Numerical issues..**

5. **Applications of multiscale finite element methods.**

SHORT BIO

Dr. Thomas Y. Hou is the Charles Lee Powell professor of applied and computational mathematics at Caltech, and is one of the leading experts in vortex dynamics and multiscale problems. His research interests are centered around developing analytical tools and effective numerical methods for vortex dynamics, interfacial flows, and multiscale problems. He was born in Guangzhou, China, and studied at the South China University of Technology before obtaining his Ph.D. from UCLA in 1987. Upon graduating from UCLA, he joined the Courant Institute as a postdoc and then became a faculty member in 1989. He moved to the applied math department at Caltech in 1993, and served as the chair of the department of applied and computational mathematics from 2000 to 2006. Dr. Hou has received a number of honors   and awards for his academic achievements, which include the Computational and Applied Sciences Award from USACM in 2005, the Morningside Gold Medal in Applied Mathematics in 2004, the SIAM Wilkinson Prize in Numerical Analysis and Scientific Computing in 2001, the Frenkiel Award from the Division of Fluid Mechanics of APS in 1998,   the Feng Kang Prize in Scientific Computing in 1997,   and   the Sloan Fellow from 1990 to 1992. He was also a plenary speaker at the International Congress of Industrial and Applied Mathematics in 2003 and an invited speaker of the International Congress of Mathematicians in 1998.   Dr. Hou has been   the founding Editor-in-Chief of the SIAM interdisciplinary journal "Multiscale Modeling and Simulation" from 2002 to 2007.