PIMS / AMI Seminar

Friday, October 17, 2014
3:00 p.m.
CAB 657

"A Dimension Splitting Method for 3D-PDEs"

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Abstract

It is well-known that there exist many problems in numerical computation for three-dimensional nonlinear partial differential equations. For example, in solving 3D Navier-Stokes equations numerically, we need to consider the following difficulties:

1, Nonlinearity;

2, Incompressible constraint condition;

3, Complex boundary geometry;

4, Boundary layer.

In order to overcome the last two difficulties, we propose a dimension splitting method in which a three- dimensional complex flow problem is split into a series of two-dimensional sub-problems. The solution of the original 3D problem is then obtained by solving a nonlinear system with N 2D sub-problems. The method presented here is different from the classical domain decomposition method; we only need to solve a 2D sub-problem in each sub-domain without solving a 3D sub-problem. Numerical simulation for 3D rotating Navier-Stokes equations in turbomachinery will be reported to demonstrate the effectiveness of the proposed dimensional splitting method.

Refreshments will be served in CAB 649 at 2:30 p.m.