CASTS TALKS

Special Program in Applied Mathematics and Applied Mechanics

Stability of thermal convection in cylindrical and annular containers

2014 - 04 - 16 (Wed.)
15:00 - 18:00
308, Mathematics Research Center Building (ori. New Math. Bldg.)

Thermal convection is not only relevant to nature phenomenon in planetary convection, in the atmosphere, in the oceans, in the earth's mantle, but also relevant to engineering applications including crystal growth, nuclear systems, industrial cooling and so on. The problem has been studied for more than a century by now and is still a topic of interest. In this talk, instabilities and nonlinear evolutions of thermal convection in cylindrical and annular containers are explored by linear stability analysis and direct numerical simulation. The main contents are study of Rayleigh-Bénard convection in a cylinder, flow instability of thermal convection in a cylinder with partially heated sidewall and Rayleigh-Bénard convection in a annulus. The instability mechanisms for the studied cases are evaluated and the processes of transition to chaos are investigated.