Graduate Talk

The method of moving planes

The method of moving planes is a very useful method in the study of nonlinear elliptic equations. The method is based on a continuous use of the maximum principles. In this talk I will introduce the method and will present a proof of the theorem of Gidas, Ni and Nirenberg on the symmetry of positive solutions, under Dirichlet boundary condition, to second order semilinear elliptic equations on a ball.

Colloquium I

Liouville type theorems for some conformally invariant equations

We will present Liouville type theorems for the equation $-\Delta u = u^{\frac{n+2}{n-2}}$ obtained in the works of Obata; of Gidas, Ni and Nirenberg; and of Caffarelli, Gidas and Spruck. We will also present some recent extensions to conformally invariant fully nonlinear elliptic equations. The method of moving planes plays a crucial role in the studies. Such Liouville type theorems are of importance in applications.

Colloquium II

A fully nonlinear version of the Yamabe problem

The Yamabe conjecture asserts that on any compact, smooth, Riemannian manifold of dimension greater than two there exists a conformal metric of constant scalar curvature. The Yamabe conjecture was proved through the works of Yamabe, Trudinger, Aubin and Schoen. In this talk a fully nonlinear version of the Yamabe problem will be discussed. Existence and compactness results will be presented. The method of moving planes plays an important role in the studies.