Steady States of Rotating Stars and Galaxies

Yilun Wu
Brown University

Wednesday, February 14, 2018
Carpenter 13, 4:00PM
3:30 in 300 Kemeny

Abstract
The equilibrium shape and density distribution of rotating fluids under self-gravitation is a classical problem in mathematical physics. Early efforts before the twentieth century revealed ellipsoidal solutions with constant density. In the twentieth century, major progress was made by studying steady rotating solutions to the compressible Euler-Poisson equations. Assuming a polytropic equation of state $p = \rho^\gamma$, a variational method, pioneered by the work of Auchmuty and Beals, proves existence of solutions if $\gamma > \frac{4}{3}$. On the other hand, we present in this talk a perturbative method that establishes a continuous set of solutions for $\gamma > \frac{6}{5}$. This method opens up new ways to prove existence results for the Vlasov-Poisson equations and for magnetic stars, together with global continuation to large rotation speed.

This talk should be accessible to .