



THE UNIVERSITY
of NORTH CAROLINA
at CHAPEL HILL

M. E. Taylor Analysis and PDE Seminar

Wednesday, September 18th
3:30 - 4:30 p.m.
Phillips Hall 385

Existence of two-dimensional deep capillary solitary water waves with constant vorticity

James Rowan (UNC)

Abstract. We consider the two-dimensional capillary water waves with nonzero constant vorticity in infinite depth, studying a Babenko equation that describes the profile of a solitary wave. When the velocity is close to a critical velocity and a sign condition involving the physical parameters is met, the Babenko equation can be reduced to the stationary focusing cubic nonlinear Schrödinger equation plus perturbative error. By an interval arithmetic argument, we show the existence of a critical value of a dimensionless physical parameter below which at least two families of velocities satisfy the focusing condition and above which only one does. This gives the existence of small-amplitude solitary wave solutions for the water wave system with constant vorticity. This is joint work with Lizhe Wan.