TEMPLE UNIVERSITY

Department of Mathematics

Analysis Seminar

Zoom meeting

Monday, March 22 2021, 2:30 p.m.

The Neumann problem for symmetric higher order elliptic differential equations

by Ariel E. Barton

University of Arkansas

Abstract: The second order differential equation $\nabla \cdot A\nabla u = 0$ has been studied extensively. It is well known that, if the coefficients A are real-valued, symmetric, and constant along the vertical coordinate (and merely bounded measurable in the horizontal coordinates), then the Dirichlet problem with boundary data in L^q or $\dot{W}^{1,p}$, and the Neumann problem with boundary data in L^p, are well-posed in the half-space, provided $2 - \varepsilon < q < \infty$ and $1 < p < 2 + \varepsilon$.

It is also known that the Neumann problem for the biharmonic operator Δ^2 in a Lipschitz domain in $\mathbb{R}^d$ is well posed for boundary data in L^p, $\max(1, p_d - \varepsilon) < p < 2 + \varepsilon$, where $p_d = \frac{2(d-1)}{d+1}$ depends on the ambient dimension d.

In this talk we will discuss recent well posedness results for the Neumann problem, in the half-space, for higher-order equations of the form $\nabla^m \cdot A\nabla^m u = 0$, where the coefficients A are real symmetric (or complex self-adjoint) and vertically constant.