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The Neumann problem for symmetric higher order elliptic differential equations

Abstract: Second-order equations of the form $\nabla \cdot A\nabla u = 0$, with A a uniformly elliptic matrix, have many applications and have been studied extensively. A well-known foundational result of the theory is 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^2 or $\dot{W}^2_1$ and the Neumann problem with boundary data in L^2 are well-posed in the upper half-space.

The theory of higher-order elliptic equations of the form $\nabla^m \cdot A\nabla^m u = 0$ is far less well understood. In this talk we will establish well posedness of the L^2 Neumann problem in the half-space, for higher-order equations with real symmetric vertically constant coefficients; this improves on our earlier work by discussing nontangential as well as square function estimates.