TEMPLE UNIVERSITY

Department of Mathematics

Analysis Seminar

Room 617 Wachman Hall

Monday, October 4 2021, 2:30 p.m.

Rellich type identities and their role in the treatment of Elliptic Boundary Value Problems in Lipschitz domains

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Abstract: Among other things, integral identities of Rellich type allow one to deduce the $L^2(\partial\Omega)$ equivalence of the tangential derivative and the normal derivative of a harmonic function with a square integrable non-tangential maximal function of its gradient in a given Lipschitz domain $\Omega \subset \mathbb{R}^n$. In this survey talk, I will establish the integral identities in $\mathbb{R}^n$ and I will illustrate the role that the aforementioned equivalence plays in establishing invertibility properties of singular integral operators of layer potential type associated with the Laplacian in Lipschitz domains in $\mathbb{R}^2$, through an interplay between PDE, Harmonic Analysis, and Complex Analysis methods.