

UNIVERSITY OF HOUSTON
DEPARTMENT OF MATHEMATICS

Seminar on Partial Differential Equations

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On the distributional divergence
of vector fields vanishing at infinity

3:00 pm in 646 PGH

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Abstract

In this talk we present results concerning the solvability of the equation $\mathbf{div} \mathbf{v} = F$. We characterize the solvability of this equation in the class of continuous vector fields vanishing at infinity. More specifically, we show that the equation $\mathbf{div} \mathbf{v} = F$ has a solution \mathbf{v} in the space of continuous vector fields vanishing at infinity if and only if F acts linearly on $BV_{\frac{m}{m-1}}(\mathbb{R}^m)$ (the space of functions in $L^{\frac{m}{m-1}}(\mathbb{R}^m)$ whose distributional gradient is a vector valued measure) and satisfies the following continuity condition: $F(u_j)$ converges to zero for each sequence $\{u_j\}$ such that the measure norms of ∇u_j are uniformly bounded and $u_j \rightharpoonup 0$ weakly in $L^{\frac{m}{m-1}}(\mathbb{R}^m)$. Characterizations in other function spaces will also be presented. This is a joint work with Thierry De Pauw.