

Generalized Co-normal Derivatives and Boundary Value Problems for Elliptic PDEs

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Elliptic PDE systems of the second order on a Lipschitz domain are considered in the talk. For functions from the Sobolev space $H^s(\Omega)$, $\frac{1}{2} < s < \frac{3}{2}$, a definition of non-unique generalized co-normal derivative is given, which is related to possible non-unique extensions of a partial differential operator and PDE right hand side from the domain Ω to its boundary. For a (rather wide) subspace of $H^s(\Omega)$, the unique canonical co-normal derivative is also defined and it is proved that the canonical co-normal derivative coincides with the classical one when the both exist. A generalization of the boundary value problem in variational settings, which makes them insensitive to the co-normal derivative inherent non-uniqueness is also discussed.

The talk is related to papers [1, 2].

References

- [1] S. E. Mikhailov. Traces, extensions and co-normal derivatives for elliptic systems on Lipschitz domains. *J. Math. Analysis and Appl.*, **378**, 324–342, 2011.
- [2] S. E. Mikhailov. Solution regularity and co-normal derivatives for elliptic systems with non-smooth coefficients on Lipschitz domains, (submitted for publication).