The Pontryagin maximum principle for the optimal control of coefficients of an elliptic differential operator

Tuesday, August 13, 2024 12:00 PM (30 minutes)

We consider optimal control problems where the control acts in the coefficient of the main part of the elliptic differential operator. We develop expansions of the cost functional with respect to perturbations of the control by characteristic functions. In comparison to standard Frechet derivatives in L^{∞} , an additional term appears, which is related to the so-called polarization tensor. We prove that the Pontryagin maximum principle is necessary for local optimality. We discuss implications of the maximum principle. In particular, we show that certain classes of problems are unsolvable.

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Session Classification: MS 06: Recent advances in PDE-constrained optimization

Track Classification: Minisymposia: MS 06: Recent advances in PDE-constrained optimization