Carleman estimates for some first-order systems of partial differential equations

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Abstract

Carleman estimates were developed in order to prove uniqueness for non-hyperbolic Cauchy problems for operators with non-analytic coefficients. More recently they have become powerful tools for many applied problems. The theory for scalar equations is rather complete, however concerning systems of equations the picture is less clear. The only general result pertaining Carleman estimates for systems of equations is due to Calderon.

In this talk we will establish Carleman estimates for certain first order systems. In contrast to previous works our result does not rely on pseudo-differential operators or diagonalization methods which allows for minimal smoothness assumptions on the coefficients. This is of some significance when considering nonlinear problems. Moreover, the explicit nature of the estimate makes the inclusion of boundary terms possible.