Public Abstract

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Title:The Dirichlet problem for elliptic and degenerate elliptic equations, and related results

In this thesis, we first prove the solvability of Dirichlet problem with L_p data on the boundary for degenerate elliptic equations. Second, We obtain L_p bounds semi-groups and their gradients, and then we get L_p bounds for Riesz transform and square functions associated to a degenerate elliptic operator in divergence form. Finally, we show that for a uniformly elliptic divergence form operator defined in an open set with Ahlfors-David regular boundary, BMO- solvability implies scale invariant quantitative absolute continuity of elliptic- harmonic measure with respect to surface measure.