

A NEW APPROACH TO SOLVABILITY OF SOME ELLIPTIC
PDE'S WITH SQUARE INTEGRABLE BOUNDARY DATA

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Abstract

I shall survey some recent results of Auscher, Axelsson and myself, concerning second order elliptic divergence form equations with complex measurable coefficients A that are independent of the transversal coordinate. In particular, we prove that the set of $A \in L^\infty(\mathbb{R}^n; \mathbb{C}^{n+1})$ for which boundary value problems with L^2 Dirichlet or Neumann data are well posed, is an open set. This work is based on results of Axelsson, Keith and myself concerning perturbed Dirac operators, which in turn builds on the solution to the Kato square root problem by Auscher, Hofmann, Lacey, Tchamitchian and myself. Recent papers on this topic, also using techniques from harmonic analysis which were developed to solve the Kato square root problem, are by Alfonseca, Auscher, Axelsson, Hofmann and Kim, and by Auscher, Axelsson and Hofmann.