



复旦大学数学科学学院 数学综合报告会

报告题目: **Optimal estimates for elliptic equations and systems from composite material**

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摘要: We study a class of second order elliptic equations and systems of divergence form, with discontinuous coefficients, arising from the study of composite materials. For the original problem proposed by Ivo Babuska concerning the system of linear elasticity, we develop an iteration technique with respect to the energy integral to overcome the difficulty from the lack of maximal principle and obtain the optimal blow-up rates of the gradients when two inclusions are close to touch. Our results hold for convex inclusions with arbitrary shape and in all dimensions. For the scalar case, we further establish an explicit dependence of the derivatives on the ellipticity coefficients and the distance between interfacial boundaries of inclusions, which unifies the known results in the literature and answers two open problems proposed by Li-Vogelius (ARMA2000). This is based on a series of joint work with Professor Jiguang Bao (BNU), Hongjie Dong (Brown), and Yanyan Li (Rutgers).

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