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Regularity estimates for BMO-weak solutions of quasilinear elliptic equations with inhomogeneous boundary conditions

This talk is about the regularity estimates in Lebesgue spaces for gradients of weak solutions of a class of general quasilinear equations of p -Laplacian type in bounded domains with inhomogeneous conormal boundary conditions. In the considered class of equations, the principals are vector field functions measurable x -variable, and nonlinearly depending on both solution and its gradient. This class of equations consists of the well-known class of degenerate p -Laplace equations for $p > 1$. Under some sufficient conditions, we establish local interior, local boundary, and global $W^{1,q}$ -regularity estimates for weak solutions with $q > p$, assuming that the weak solutions are in the John-Nirenberg BMO space. The obtained results improve available results because they do not require the boundedness or continuity assumptions on solutions. The results also unify and cover known results for equations in which the principals are vector field function of only x -variable and the gradient of solution variable. More than that, we also give a method to treat non-homogeneous boundary value problems directly without using any form of translations that is sometimes complicated due to the nonlinearities.