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Elliptic Regularity Estimates With Optimized Constants and Applications

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We revisit the classical theory of linear second-order uniformly elliptic equations in divergence form whose solutions have Holder continuous gradients, and prove versions of the generalized maximum principle, the C1,\alpha-estimate, the Hopf-Oleinik lemma, the boundary weak Harnack inequality and the differential Harnack inequality, in which the constant is optimized with respect to the norms of the coefficients of the operator and the size of the domain. Our estimates are complemented by counterexamples which show their optimality. We also give applications to the Landis conjecture and spectral estimates.