Boundary weak Harnack estimates and regularity for elliptic PDE in divergence form

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Abstract

We obtain a global extension of the classical weak Harnack inequality, which extends and quantifies the Hopf-Oleinik boundary-point lemma, for uniformly elliptic equations in divergence form. Among the consequences is a boundary gradient estimate, due to Krylov and well-studied for non-divergence form equations, but completely novel in the divergence framework. see [2], as well as [3, 1], for variants of this "boundary weak Harnack inequality" (BWHI). Another consequence is a new more general version of the Hopf-Oleinik lemma.

Keywords Hopf-Oleinik Lemma, boundary-point lemma, elliptic equations, boundary gradient estimate

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