

# Flipping geometries: a non-local regularity theory for local elliptic problems

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We present an abstract result ensuring that one-sided geometric control yields two-sided estimates for functions satisfying general conditions. Our findings resonate with nonlinear elliptic problems, including supersolutions to fully nonlinear elliptic equations, and functions in the De Giorgi class. Among the consequences of our abstract results, we highlight regularity estimates in Hölder spaces and the inclusion of a given function in the viscosity class. The main implication of our results concerns the non-local realm, as we derive fractional regularity estimates for supersolutions to (local) fully nonlinear elliptic equations. As a by-product of our arguments, we discuss the regularity of the convex envelope in fractional Sobolev spaces. We close the talk with several open problems and further directions of research.