1062-35-17 **Tadele Mengesha*** (mengesha@math.lsu.edu), Department of Mathematics, Louisiana State University, Baton Rouge, LA 70803, and **Nguyen Cong Phuc,**, Department of Mathematics, Louisiana State University, Baton Rouge, LA 70803. *Global Weighted and Regularity Estimates for Nonlinear PDEs on Nonsmooth Domains.*

Global weighted L^p estimates are obtained for the gradient of solutions to nonlinear elliptic PDEs of the form

$$\operatorname{div} \mathbf{a}(\nabla u, x) = \operatorname{div} \mathbf{f} \quad \text{in } \Omega, \quad u = 0 \quad \text{on } \partial\Omega,$$

where Ω is a bounded nonsmooth domain. Morrey and Hölder space regularity of solutions are also established. These results generalize existing L^p estimates for nonlinear equations. The nonlinearities are at most of linear growth and assumed to have a uniform small mean oscillation in the second variable. The boundary of the domain, on the other hand, may exhibit roughness but assumed to be sufficiently flat. Our approach uses maximal function estimates, Vitali covering lemma from harmonic analysis, and also known regularity of solutions to reference homogeneous equations. (Received June 07, 2010)