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Henry C Simpson* (hsimpson@math.utk.edu), Department of Mathematics, University of Tennessee, Knoxville, TN 37996. *Degree Theoretic Aspects of Quasilinear Elliptic Systems.*

We consider a large class of quasilinear elliptic systems with nonlinear boundary conditions on a bounded domain. We develop and apply a degree theory for proper Fredholm maps that applies directly to these systems and is reminiscent of Leray-Schauder degree. Applications are made in particular to the equations of compressible and incompressible elasticity, and Navier-Stokes equations in the form of a global branching or existence theorem. The equations can be of mixed-order elliptic type. (Received August 24, 2005)