1020-31-266   **Tadeusz Iwaniec*** (`tiwaniec@syr.edu`), Department of Mathematics, Syracuse University, Syracuse, NY 13244, and **Jani Onninen**, Department of Mathematics, Syracuse University, Syracuse, NY 13244. *Hardy Space Estimates of the Jacobian Determinant in Terms of its Subdeternminants.*

Recent advances in the Calculus of Variations (polyconvex energy integrals), Geometric Function Theory and Nonlinear Elasticity rely on various estimates of the Jacobian determinants of weakly differentiable mappings. This is where both harmonic and geometric analysis come into play. We establish the Hardy H1-estimates. This problem arises naturally in the study of mappings of finite distortion and, in particular, deformations of hyperelastic materials. The cancellation phenomenon in singular integrals and the associated commutators are the basic arguments here. However, the novelty of our approach is the introduction of a maximal type operator where Hardy-Littlewood maximal operator meets Stein spherical maximal operator. (Received August 29, 2006)