Sungwon Cho and Xiaodong Yan* (xiayan@math.msu.edu), Department of Mathematics, Michigan State University, East Lansing, MI 48824. Singular set for Lipschitzian critical points of polyconvex functionals from nonlinear elasticity.

Partial regularity is proved for Lipschitzian critical points of polyconvex functionals motivated by nonlinear elasticity provided \( \|Du\|_{L^\infty} \) is small enough. In particular, the singular set for a Lipschitzian critical point has Hausdorff dimension strictly less than \( n \) when \( \|Du\|_{L^\infty} \) is small enough. Model problems treated include

\[
\int_\Omega |\nabla u|^2 + |\det \nabla u|^2
\]

where \( u : \Omega (\subset \mathbb{R}^2) \rightarrow \mathbb{R}^2 \), and

\[
\int_\Omega |\nabla u|^2 + |\nabla u|^s + |\text{Adj} \nabla u|^s + |\det \nabla u|^s
\]

where \( u : \Omega (\subset \mathbb{R}^3) \rightarrow \mathbb{R}^3 \) with \( s \geq 2 \).

Moreover, it is shown that the singular set of a Lipschitzian global minimizer has Hausdorff dimension strictly less than \( n \). (Received August 20, 2006)