1015-41-201 **Eitan Tadmor*** (tadmor@cscamm.umd.edu), Department of Mathematics and CSCAMM, University of Maryland, CSIC Bldg. #404, Paint Branch Drive, College Park, MD 20742, **Suzanne Nezzar**, Richard Stockton College of NJ, Pomona, NJ 08240, and **Luminita Vese** (lvese@math.ucla.edu), Department of Mathematics, UCLA, 405 Hilgard Ave., Los Angeles, CA 90095. *On a multiscale representation of images as hierarchy of edges.*

I will discuss a novel representation of general images which are decomposed into hierarchical scales of edges. The starting point is a variational decomposition of an image, $f = u_0 + v_0$, where $[u_0, v_0]$ is the minimizer of the interpolation functional, $J(f, c_0) = \inf_{u+v=f} \|u\|_{BV} + c_0\|v\|^2_{L^2}$. Such minimizers are standard tools for denoising, deblurring, compression, ... of images. Here, u_0 should capture 'essential features' of f, to be separated from the spurious components in v_0, and c_0 is a fixed threshold which dictates separation of scales. To proceed, we iterate the refinement step $[u_{j+1}, v_{j+1}] = \text{arginf}\, J(v_j, c_0 * 2^j)$, leading to the hierarchical decomposition, $f = \sum_{j=0}^{k} u_j + v_k$. The resulting hierarchical decomposition, $f \sim \sum_j u_j$, is essentially nonlinear. The questions of convergence, energy decomposition, localization and adaptivity are discussed. The decomposition is constructed by numerical solution of successive Euler-Lagrange equations. Numerical results illustrate applications to synthetic and real images (both grayscale and colored images). (Received February 05, 2006)