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**Eitan Tadmor** (tadmor@cscamm.umd.edu), The University of Maryland, CSCAMM, 4146 CSIC Building #406, Paint Branch Drive, College Park, MD 20742, and **Prashant Athavale\*** (prashant@math.ucla.edu), Department of Mathematics, University of California, 520 Portola Plaza, Los Angeles, CA 90095. *Novel Integro-differential equations in image processing and its applications.*

We show that the hierarchical multiscale image representation of Tadmor, Nezzar and Vese, [2004], gives rise to a novel integro-differential equation (IDE) for a multiscale image representation. To this end, one *integrates* in inverse scale space a succession of refined, recursive ‘slices’ of the image, which are balanced by a typical curvature term at the finer scale. The importance of the IDE lies in the fact that even though its motivation comes from a variational problem, we can manipulate the IDE suitable to our image processing needs. We propose different forms of the IDE with filtering, tangential smoothing, and deblurring. (Received September 22, 2009)