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Stacey Elizabeth Levine* (sel@mathcs.duq.edu), 440 College Hall, Department of Mathematics & Computer Science, Duquesne University, Pittsburgh, PA 15282. *An Adaptive Variational Model for Image Decomposition.*

We propose a new model for image decomposition which separates an image into a cartoon, consisting only of geometric objects, and an oscillatory component, consisting of textures and noise. The model is given in a variational formulation with adaptive regularization norms for both the cartoon and texture part. The energy for the cartoon interpolates between total variation regularization and isotropic smoothing, while the energy for the textures interpolates between Meyer's G norm and the H^{-1} norm. These energies are dual in the sense of the Legendre-Fenchel transform and their adaptive behavior preserves key features such as object boundaries and textures while avoiding staircasing in what should be smooth regions. Existence and uniqueness of a solution is established and experimental results demonstrate the effectiveness of the model for both grayscale and color image decomposition. (Received August 15, 2005)