1009-49-166   **Selim Esedoglu** and **Kevin R Vixie*** (`vixie@lanl.gov`), Mathematical Modeling and Analysis, T-7, Theoretical Division, Los Alamos National Laboratory, Los Alamos, NM 87544. *Exact solutions for the L1 TV functional.*

In this talk I present joint work with Selim Esedoglu in which we obtain charaterizations of exact solutions to the L^1 total variation functional used in image denoising.

In contrast to the original Rudin-Osher-Fatemi (ROF) model:

$$F(u) \equiv \int |\nabla u| + \lambda \int |u - f|^2$$

the L^1 TV functional, is given (as the expected from the name) by:

$$F(u) \equiv \int |\nabla u| + \lambda \int |u - f|,$$

and has several appealing properties including contrast preservation as well as a closer relation to the underlying geometric analysis. One can prove nice properties like, for example, the fact that for $f =$ a characteristic function on a set with smooth boundary, there is a λ^* such that for all $\lambda > \lambda^*$ the minimizing $u = f$.

I will present three results aimed at giving a more complete characterization of exact solutions to minimization problems in which f is a characteristic function. In particular, the results should be of interest to those interested in morphology as well as reseachers working in mathematical image processing. (Received August 15, 2005)