1086-52-1464   **Issam I. Safa*** (`issam.safa@gmail.com`), Columbus, OH 43221. *Features Reconstruction Gets Help From Unlikely Sources: Graph Laplacian and Reeb Graph.*

Reconstructing sharp features from a set of discrete points sampled from a hidden surface is a fundamental problem in geometric modeling. The task becomes challenging in the presence of "singularities" in the surface such as boundaries and non-manifold regions. The reconstruction process can be broken into two steps: first identifying the feature points, and second, reconstructing the feature lines using the identified points. We achieve this by recruiting the help of two unlikely sources: the graph Laplacian and the Reeb graph. In this talk, we will discuss recent results on the behavior of the graph Laplacian in the vicinity of a certain class of singularities, how we can use the Laplacian to identify sample points near feature lines, and how we can use the Reeb graph to reconstruct the feature lines themselves. (Received September 22, 2012)