

1035-42-1987 **Mauro Maggioni*** (mauro.maggioni@duke.edu), Department of Mathematics, 117 Physics Bldg., BOX 90320, Duke University, Durham, NC 27708. *Analysis of and on data sets with diffusion processes.*

I will discuss how data sets modeled as weighted graphs can be studied through diffusions or random walks on them. These diffusions, and in particular the associated heat kernel, can be used to study certain geometric properties of the graph, as well as finding bi-Lipschitz parametrizations (mapping geodesic distances on the set to Euclidean distances in parameter space) on large chunks of the data, at least when the data is "manifold-like". Moreover, one can associate dictionaries of functions to the diffusion operators, for example Fourier-like basis functions (the eigenfunctions of a Laplacian) or wavelet-like functions (called diffusion wavelets). These dictionaries can be used to analyze and approximate functions on graphs, and to perform tasks such as compression and denoising, or learning. We present several examples - from semisupervised learning to image denoising and to document organization. (Received September 21, 2007)