1077-42-1602   **Amit Bernanis** (`amitberm@post.tau.ac.il`), 8 Levnon Street, 69978 Tel Aviv, Israel, **Amir Averbuch*** (`amir@math.tau.ac.il`), 8 Levnon Street, 69978 Tel Aviv, Israel, and **Ronald Raphel Coifman**, PO Box 208283, New Haven, CT 06520-8283. *Multiscale data sampling and function extension for data analysis and processing of large high dimensional data.*

Many kernel based methods, which are used for dimensionality reduction and data mining applications, involve an application of a SVD to a kernel matrix, whose dimensions are proportional to the size of the data. When data is accumulated over time, a method for function extension is required. We introduce a multiscale scheme for data sampling and function extension, which can be applied in any metric space, not necessarily a vector space. The scheme is based on mutual distances between data points. It makes use of a coarse-to-fine hierarchy of the multiscale decomposition of a Gaussian kernel. It generates a sequence of subsamples, which we refer to as adaptive grids, and a sequence of approximations to a given empirical function on the data, as well as their extensions to any newly-arrived data point. The subsampling is done by a special decomposition of the associated Gaussian kernel matrix in each scale in the hierarchical decomposition. In each scale, the data is sampled by an interpolative decomposition of a low-rank Gaussian kernel matrix that is defined on the data. Demonstration of the processing of large volumes of high-dimensional data will be given. (Received September 20, 2011)

1