1145-VQ-2994 **Olivia R. Vasquez*** (vasquezol@cwu.edu), **Amadou Y. Bah** and **Jackson Abascal**. *A Non-iterative Parallelizable Eigenbasis Algorithm for Johnson Graphs.* Preliminary report.

We present a new $O\left(k^2\binom{n}{k}^2\right)$ method for generating an orthonormal basis of eigenvectors for the Johnson graph $J(n,k)$. Unlike standard methods for computing a full eigenbasis of sparse symmetric matrices, the algorithm presented here is non-iterative, and produces exact results under an infinite-precision computation model. In addition, our method is highly parallelizable; given access to unlimited parallel processors, the eigenbasis can be constructed in only $O(n)$ time given n and k. We also present a highly parallelizable algorithm for computing projections onto the eigenspaces of $J(n,k)$. Such an algorithm is useful for spectral analysis, in which these eigenspaces serve as spaces of ordered effects for data modeled on subsets of $\{1,\ldots,n\}$ of a fixed size k. (Received September 26, 2018)