1. MagdyTawfik Hanna, Nabila Philip Attalla Seif and Waleed Abd El Maguid Ahmed, "Hermite-Gaussian-Like Eigenvectors of the Discrete Fourier Transform Matrix Based on the Singular Value Decomposition of its Orthogonal Projection Matrices," IEEE Transactions on Circuits and Systems, Part I: Regular papers, Vol. 51, No. 11, pp. 2245-2254, November 2004.

Abstract:

A new technique is proposed for generating initialorthonormal eigenvectors of the discrete Fourier transform matrix **F** by the singular-value decomposition of its orthogonal projection matrices on its eigenspaces and efficiently computable expressions for those matrices are derived. In order to generate Hermite-Gaussian-like orthonormal eigenvectors of **F** given the initial ones, a new method called the sequential orthogonal Procrustes algorithm (**SOPA**) is presented based on the sequential generation of the columns of a unitary matrix rather than the batch evaluation of that matrix as in **OPA**. It is proved that for any of the **SOPA**, the **OPA**, and the Gram-Schmidt (**GSA**) the output Hermite-Gaussian-like orthonormal eigenvectors are invariant under the change of the input initial orthonormal eigenvectors.