***Matrix Factorization***





 (Permutation matrix *P* to avoid zeros in the pivot position*s*).

 (*m* by *m* invertible *E*) (any *A*) = rref(*A*)

 = (lower triangular matrix *C*) (transpose is upper triangular)

 = (orthonormal columns in *Q*) (upper triangular *R*)

 = (eigenvectors in *S*) (eigenvalues in Λ) (left eigenvectors in ).

 = (orthogonal matrix *Q*) (real eigenvalue matrix Λ) 

 = (generalized eigenvectors in *M*) (**J**ordan blocks in *J*) 

 = 

= 

 = (orthogonal matrix *Q*) (symmetric positive definite matrix H)

 = (unitary *U*) (eigenvalue matrix Λ) (which ).

 = (unitary *U*) (triangular *T* with λ ‘s on diagonal) ().

 = one step of the **FFT**.