Problem 2:

­SVD(A) =>

A =

where U is orthonormal mxm column matrix, S is mxn diagonal matrix of singular values, is nxn orthonormal matrix

Using the SVD representation of A:

Prove Eigen Decomposition of (Normal decomp form: ):

Multiply both sides by V

V can be represented as [v1,v2,…vn] and as nxn matrix with [] on the main diagonal (singular values)

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Left hand side matrix multiplication produces:

Right hand side matrix multiplication produces:

column matrix

Since the column vectors of V are simply being scaled by the corresponding scalars of the matrix according to the right side multiplication, we can conclude that V must be the Eigenvector matrix and must be the diagonal eigenvalue matrix of .

Conclusion:

Orthonormal matrix V of SVD(A) is the eigenvector matrix and is the eigenvalue matrix of