

MATH 313 Spring 2009, Homework 12, Computer-based problems

We re-examine the matrix A from Homework 9, which was

$$A = \begin{pmatrix} 0 & -47 & 56 & 59 & 21 \\ -234 & 136 & -232 & -150 & 2 \\ -122 & -301.4 & 127.2 & 197.8 & 256.2 \\ 120 & -150.8 & 174.4 & 139.6 & 54.4 \\ -142 & -245.4 & 81.2 & 135.8 & 216.2 \end{pmatrix}.$$

Problem 1 Compute the SVD of A , and write it in a sum-of-projections form. Observe that some of the projection operators are complex. What does this mean? Use the Matlab command “svd” to compute the SVD.

Problem 2 Using the SVD and the eigenvalue decomposition of A , explain what happens for a random vector v when you form the product $A^k v$ for large k .