

Generalized Eigenvalue Problem

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Skeleton code of `linesearch.m` has written by my instructor Emre Mengi and it uses line search method. Skeleton code of `Newton_sys_ls.m` has written by my instructor Emre Mengi, it uses Newton's method to find one of the generalized eigenvalues and corresponding eigenvector.

`genEigSystem.m` converts the problem into a form that Newton's method can operate on. The problem is finding a generalized eigenvalue and corresponding eigenvector such that

$$Av = \lambda Bv$$

where

$$A = \begin{bmatrix} 1 & 2 & -1 & 0 & 0 \\ 2 & 1 & 2 & -1 & 0 \\ -1 & 2 & 1 & 2 & -1 \\ 0 & -1 & 2 & 1 & 2 \\ 0 & 0 & -1 & 2 & 1 \end{bmatrix}$$

and

$$B = \begin{bmatrix} 1 & -1 & 0 & 0 & 0 \\ -1 & 1 & -1 & 0 & 0 \\ 0 & -1 & 1 & -1 & 0 \\ 0 & 0 & -1 & 1 & -1 \\ 0 & 0 & 0 & -1 & 1 \end{bmatrix}$$