### Question -- 3

#### Instrucation

Power Iteration Method for approximating the dominant Eigenvalues and Eigenvectors of a Matrix

Dominant eigenvalues and eigenvectors

* is the dominant eigenvalue of if for all
* The corresponding eigenvector is also called dominant

So dominant is the highest eigenvalue of matrix A

using power iteration method finding the eigenvalue:

suppose is an eigenvector of , then its eigenvalue is

$\lambda = \cfrac{x^T A^T x}{x^T x} = \cfrac{(A x)^T v}{x^T x}$, is called Rayleigh Quotent

Given the eigenvector approximation, the Rayleigh quotient is the optimal approximation of the eigenvalue. In the power iteration, the eigenvalue approximation can be obtained by using the Rayleigh quotient for the normalized eigenvector.