

4. If the Jacobi iteration $A_{n+1} = Q_n^T A_n Q_n$, where $A_1 = A$ and A is symmetric, converges to diagonal form in, say, 4 iterations, so that $A_5 \approx D$, what are the eigenvalues of A , and what are the eigenvectors?

5. Find an orthogonal matrix Q such that $Q A Q^{-1}$ is upper Hessenberg, if

$$A = \begin{bmatrix} 2 & 4 & -3 \\ 5 & 1 & 7 \\ -12 & 7 & 1 \end{bmatrix}$$

6. **Use the inverse power method** to find the smallest (in absolute value) eigenvalue of A , and the corresponding eigenvector, starting with $x_0 = (3, -2)$, if

$$A = \begin{bmatrix} 4 & 2 \\ 1 & 3 \end{bmatrix}$$