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Math221: Matrix Computations
Homework #12, Do not hand in

- Let $A \in \mathbf{R}^{n \times n}$ be a square matrix. Let $H \in \mathbf{R}^{n \times n}$ be the upper Hessenberg matrix obtained from Hessenberg reduction on A. It is known that there exists an orthogonal matrix Q such that $Q^T A Q = H$. What is the first column of Q?

- Let $A \in \mathbf{R}^{n \times n}$ be a square matrix. Let Q be orthogonal and H upper Hessenberg such that $Q^T A Q = H$. Let P be the Householder matrix, the first column of which is the same as that of Q. Define $\hat{A} = P^T A P$, and let $\hat{H}$ be the upper Hessenberg matrix obtained from Hessenberg reduction on $\hat{A}$. What is the relationship between $\hat{H}$ and H?

- Problems 6.7, 6.10 (parts 1-4), 6.11, 6.12, 6.13, 6.14.