- Unreduced and reduced Hessenberg matrices.
- Deflation.
- Shift.
- Wilkinson shift.
- Double shift.
- Francis shift.
- Implicit shifting.
- Implicit Q-theorem.
- Arnoldi iteration.
- Breakdown of Arnoldi iteration.
- Krylov subspace.
- Rayleigh–Ritz method.
- Ritz values, Arnoldi estimates.
- Residual.
- GMRES
- Lanczos iteration.
- Power iteration.
- Inverse power iteration.
- Rayleigh ratio.

18.9 Problems

Problem 18.1. Prove Theorem 18.2; see Problem 13.7.

Problem 18.2. Prove that if a matrix A is Hermitian (or real symmetric), then any Hessenberg matrix H similar to A is Hermitian tridiagonal (real symmetric tridiagonal).

Problem 18.3. For any matrix (real or complex) A, if $A = QR$ is a QR-decomposition of A using Householder reflections, prove that if A is upper Hessenberg then so is Q.