

Concise, well-written mathematics is valued. Each question is worth 2.5 points.

1. (cf. 4.2.3 in Zhang) Compute determinant of the $n \times n$ tridiagonal matrix having main diagonal 0, superdiagonal 1, subdiagonal 1.
2. (cf. 4.2.5 in Zhang) Compute determinant of the $n \times n$ tridiagonal matrix having main diagonal 2, superdiagonal 1, subdiagonal 1.
3. (cf. 4.3.5 in Zhang) Let $A, B \in \mathbb{C}^{n \times n}$ be circulant matrix. Show $AB = BA$, and AB is also a circulant matrix.
4. (cf. 5.1.12 in Zhang) Let $A \in \mathbb{C}^{n \times n}$ be Hermitian. Show $(A - iT)^{-1}(A + iT)$ is unitary.