Project 1 Notes

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1 Problem 1

Let normal matrices, those with diagonalization be on the form

$$A = U\Lambda U^H$$

Where Λ is a diagonal complex $n \times n$ matrix and U a unitary (complex) matrix such that $U^H U = I$ (recall that U^H is the complex conjugate of U^T).

Show that for any such matrix, one has $\|A\|_2 = \rho(A)$, where $\rho(A)$ is the spectral radius of A .

Answer.

Ideas

- Complex conjugate
$$A^H = \overline{A^T}$$
- Definition of spectral radius is denoted by
$$\rho(A) = \max_{\lambda_i \in \sigma(A)} \{\lambda_i\}$$
of the eigenvalues λ_i in the eigenvalue spectrum $\sigma(A)$.

2 References