葉均承
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Homework 9-3

應數一線性代數

Section 9-3

1. (05/28) 課本: 7, 11

2. (05/28) Extra:

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

Use the process in Schur's Lemma to find an unitary matrix U such that $U^{-1}AU$ is an upper triangular.

3. (06/04) 課本: 13, 17, 19, 23

2. 答案:

$$A = \begin{bmatrix} 4 & -4 & -3 \\ 1 & 2 & -1 \\ 2 & -4 & -1 \end{bmatrix}, U_1 = \begin{bmatrix} \frac{1}{\sqrt{2}} & \frac{1}{\sqrt{2}} & 0 \\ 0 & 0 & 1 \\ \frac{1}{\sqrt{2}} & \frac{-1}{\sqrt{2}} & 0 \end{bmatrix}, U_2 = \begin{bmatrix} 1 & 0 & 0 \\ 0 & 0 & 1 \\ 0 & 1 & 0 \end{bmatrix}$$

Then

$$U_2^* U_1^* A U_1 U_2 = \begin{bmatrix} 1 & -4\sqrt{2} & 5 \\ 0 & 2 & \sqrt{2} \\ 0 & 0 & 2 \end{bmatrix}$$