葉均承
Jean Yeh

Week 6

應數一線性代數

沒有星號題的答案見課本後面

Section 2-1

課本 problem 3, 11, 23, 27, 28*, 31, 33*

28.

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33.

Suppose that

$$r_1[1,0,1] + r_2[2,s,3] + r_3[1,-s,0] = [0,0,0]$$

, so that

$$[r_1 + 2r_2 + r_3, sr_2 - sr_3, r_1 + 3r_2] = [0,0,0].$$

We solve that linear system

$$\begin{aligned} r_1+ \quad 2r_2 \quad +r_3 \quad &= 0, \\ \quad sr_2 \quad -sr_3 \quad &= 0, \\ r_1+ \quad 3r_2 \quad \quad &= 0. \end{aligned}$$

$$\left[\begin{array}{ccc|c} 1 & 2 & 1 & 0 \\ 1 & s & -s & 0 \\ 1 & 3 & 0 & 0 \end{array}\right] \sim \left[\begin{array}{ccc|c} 1 & 2 & 1 & 0 \\ 0 & s & -s & 0 \\ 0 & 1 & -1 & 0 \end{array}\right] \sim \left[\begin{array}{ccc|c} 1 & 2 & 1 & 0 \\ 0 & 1 & -1 & 0 \\ 0 & 0 & 0 & 0 \end{array}\right]$$

We see that the vectors are dependent for all values $s \in \mathbb{R}$.