

姓名: SOLUTION

葉均承 應數一線性代數

學號: _____

Quiz 4

考試日期: 2020/03/25

1. 請框出答案. 2. 不可使用手機、計算器, 禁止作弊!

1. Find the projection of $[1, 0, 0]$ on the subspace $W = sp([2, 1, 1], [1, 0, 2])$ in \mathbb{R}^3

Answer:

$$\frac{1}{7}[5, 3, 1]$$

$$\vec{b} = [0, 0, 1], \vec{v}_1 = [2, 1, 1], \vec{v}_2 = [1, 0, 2],$$

$$\vec{v}_3 = \vec{v}_1 \times \vec{v}_2 = [2, -3, -1]$$

$$\overrightarrow{b_{W^\perp}} = \frac{\vec{b} \cdot \vec{v}_3}{\vec{v}_3 \cdot \vec{v}_3} \vec{v}_3 = \frac{1}{7}[2, -3, -1]$$

$$\vec{b}_W = \vec{b} - \overrightarrow{b_{W^\perp}} = \frac{1}{7}[5, 3, 1]$$