

MATHEMATICS 2270. Homework # 6.

1. Determine if there exists an orthogonal transformation $T : \mathbb{R}^3 \rightarrow \mathbb{R}^3$ such that

$$T \begin{bmatrix} 1 \\ -1 \\ 2 \end{bmatrix} = \begin{bmatrix} 2 \\ -1 \\ 1 \end{bmatrix},$$

$$T \begin{bmatrix} 1 \\ 2 \\ -1 \end{bmatrix} = \begin{bmatrix} 1 \\ 2 \\ 1 \end{bmatrix}.$$

2. Find matrix of the orthogonal projection to the span of the vectors:

$$\begin{bmatrix} 1 \\ -1 \\ -1 \\ 1 \end{bmatrix}, \begin{bmatrix} 1 \\ 9 \\ 5 \\ 3 \end{bmatrix}.$$

3. §5.4, # 22.

4. §5.4, # 30.

5. §6.1, # 16.

6. §6.1, # 32.