Day 16

(1) Find the coordinates for $\begin{bmatrix} 1 & 2 \\ 3 & 4 \end{bmatrix}$ with respect to the basis

$$\begin{bmatrix} 1 & 1 \\ 1 & 1 \end{bmatrix}, \begin{bmatrix} 0 & 1 \\ 1 & 1 \end{bmatrix}, \begin{bmatrix} 0 & 0 \\ 1 & 1 \end{bmatrix}, \begin{bmatrix} 0 & 0 \\ 0 & 1 \end{bmatrix}.$$

(2) Find the coordinates of $\begin{bmatrix} 5 \\ 6 \end{bmatrix}$ with respect to the basis $\begin{bmatrix} 2 \\ 1 \end{bmatrix}, \begin{bmatrix} 5 \\ -1 \end{bmatrix}$.

(3) If p has coordinates $\begin{bmatrix} -1 \\ 0 \\ 8 \end{bmatrix}$ with respect to basis $(x+3)^2$, $x+5$, x^2, then what are the coordinates of p with respect to basis $1, x, x^2$?

Day 16

(4) If $\vec{v}$ has coordinates $\begin{bmatrix} 1 \\ 2 \\ 3 \end{bmatrix}$ with respect to basis $\begin{bmatrix} 4 \\ 0 \\ 4 \\ 0 \end{bmatrix}, \begin{bmatrix} 0 \\ 7 \\ 0 \\ 0 \end{bmatrix}, \begin{bmatrix} 0 \\ 0 \\ 0 \\ 3 \end{bmatrix}$ of subspace $W = \{ \vec{x} \in \mathbb{C}^4 \mid x_1 = x_3 \}$, then what are the coordinates of $\vec{v}$ with respect to basis $\begin{bmatrix} 2 \\ 0 \\ 2 \\ 0 \end{bmatrix}, \begin{bmatrix} 0 \\ -1 \\ 0 \\ 0 \end{bmatrix}, \begin{bmatrix} 0 \\ 0 \\ 0 \\ 10 \end{bmatrix}$ of W?