Exercise 1. The transformation matrix of $f : R^3 \to R^3$ relative to the unit basis is $A_f = \begin{bmatrix} 1 & 3 & -1 \\ 3 & 1 & 2 \\ 4 & 0 & 1 \end{bmatrix}$.

Write the transformation matrix relative to basis {[-1, 3, 2], [-2, 0, 1], [0, 2, 4]}.

Exercise 2. For the transformation with matrix: $\begin{bmatrix} 0 & 2 & -4 \\ 2 & -1 & 2 \\ -3 & 1 & 5 \end{bmatrix}$ relative to basis {$\underline{u}_1$, $\underline{u}_2$, $\underline{u}_3$}

of U find the image of vector $3\underline{u}_1$ - $\underline{u}_2$ + $2\underline{u}_3$.

Exercise 3. For the transformation with matrix $A_f = \begin{bmatrix} -2 & 3 \\ 4 & -6 \end{bmatrix}$ find the kernel of the transformation f.

Exercise 4. Find the eigenvalues and eigenvectors for the matrix $\begin{bmatrix} 3 & -1 & 0 \\ 6 & -2 & 0 \\ 2 & -1 & 1 \end{bmatrix}$.