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, 2, 3], [-1, 1, 0], [1, 1, 1]}.

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 $2\underline{u}_1 - 6\underline{u}_2 + 3\underline{u}_3$.

Exercise 3. For the transformation with matrix $A_f = \begin{bmatrix} 2 & 1 \\ 6 & 3 \end{bmatrix}$ find the kernel of the transformation f .

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