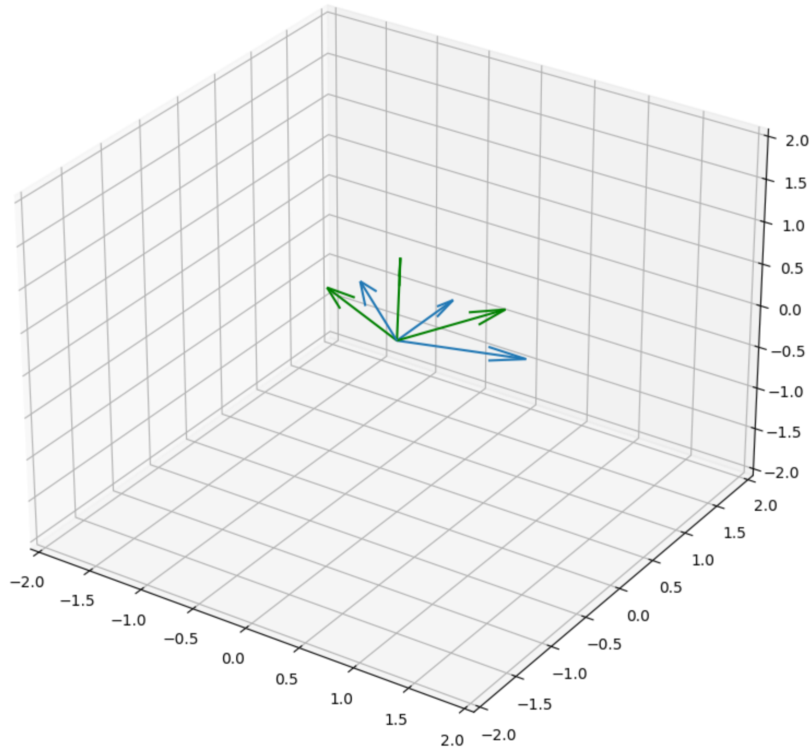
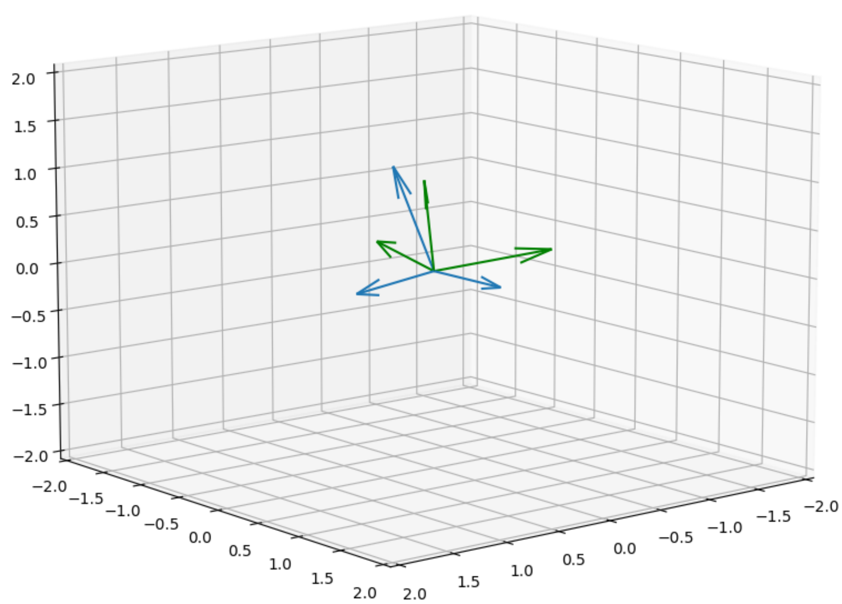
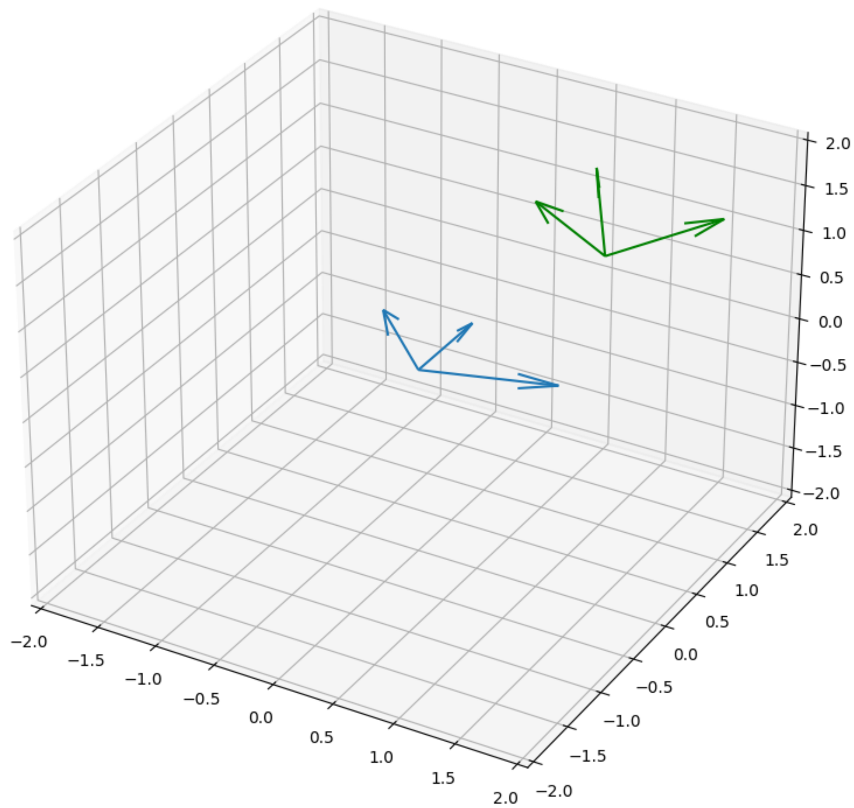
- Finding the coordinates of vectors of β' in β and vice versa:
  We have the rotation matrix (R) which expresses the transformation from β' to β. Therefore, we can write $R = \begin{pmatrix} \vdots & \vdots & \vdots \\ b'_{1_\beta} & b'_{2_\beta} & b'_{3_\beta} \\ \vdots & \vdots & \vdots \end{pmatrix}$. Taking each column of R, we found the vectors of β' in β and taking R^{-1}, we found the vectors of β in β'.

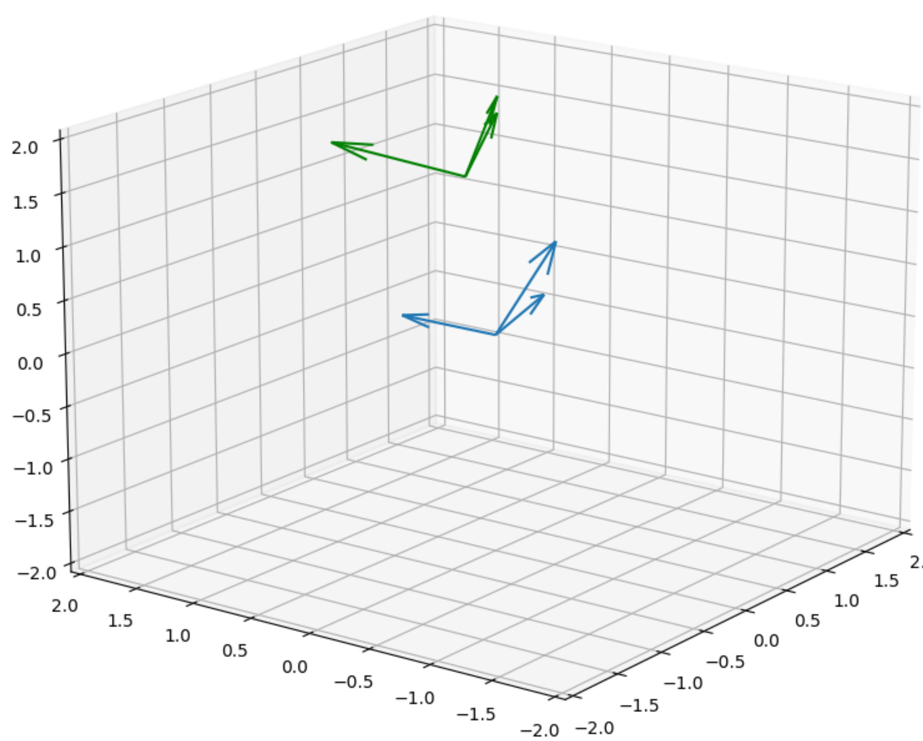
- Plotting the vectors from beta and beta' in standard basis:
  -Vectors form beta (blue) & vectors from beta' (green)



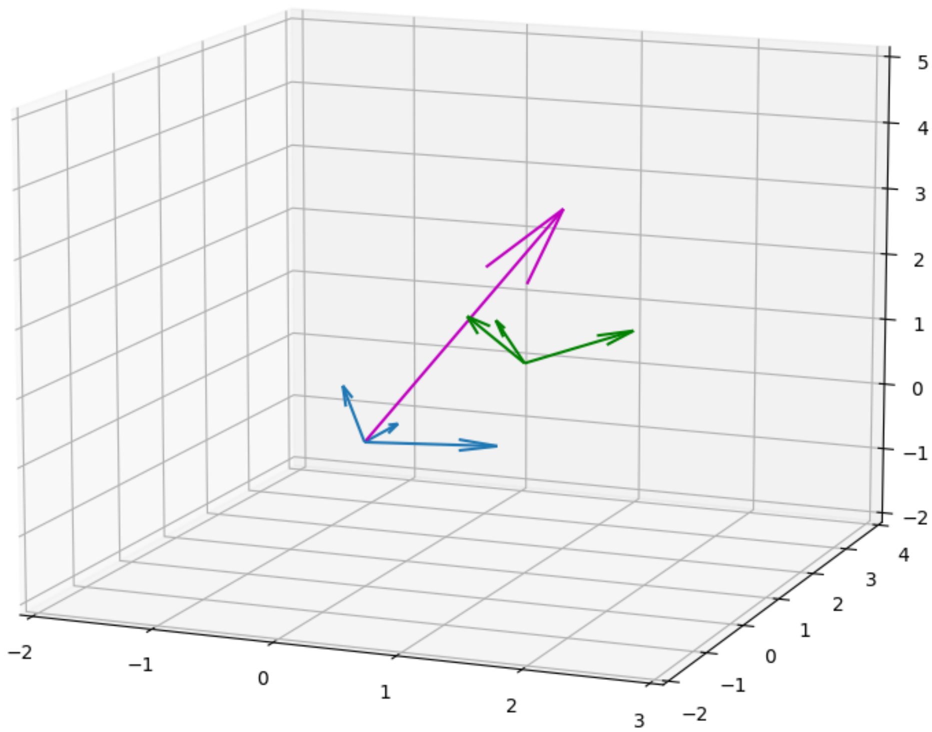


- Plotting the coordinate systems (O, beta) and (O’, beta’) & their basic vectors originating from O and O’:

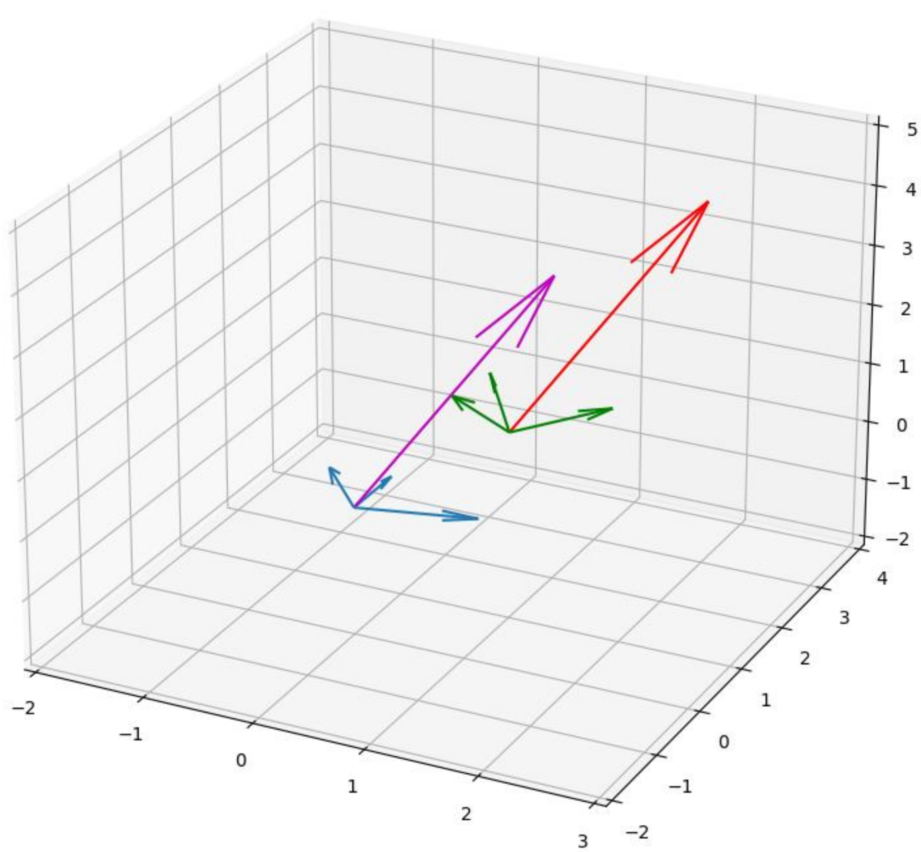




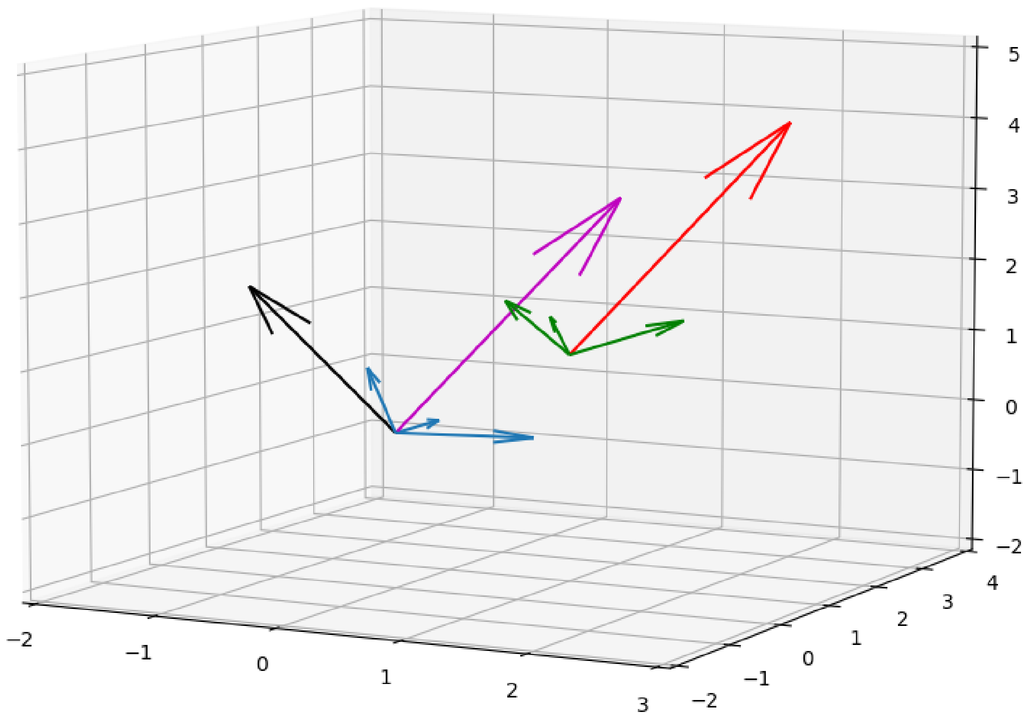
- $\vec{x}_\beta$ plot (magenta arrow):



- $\vec{y}_{\beta'}$ plot (red arrow):



- $\overrightarrow{OZ}_\beta$ plot (black arrow):



-In order to find OZ in beta basis, I used the alibi representation.

Therefore, $\overrightarrow{O'Z}_{\beta'}$ $\left(which\ is\ \vec{Z'}_{\beta'}\right) = \vec{x}_\beta$

$\overrightarrow{O'Z}_{\beta'} = \overrightarrow{OZ}_{\beta'} - \overrightarrow{OO'}_{\beta'} \Rightarrow \vec{x}_\beta = \overrightarrow{OZ}_{\beta'} - \overrightarrow{OO'}_{\beta'}$

$R^{-1}(\overrightarrow{OZ}_\beta - \overrightarrow{OO'}_\beta) = \vec{x}_\beta \Rightarrow \overrightarrow{OZ}_\beta = R\vec{x}_\beta + \overrightarrow{OO'}_\beta$

$\overrightarrow{OZ}_\beta = R\vec{x}_\beta - \overrightarrow{O'O}_\beta \Rightarrow \overrightarrow{OZ}_\beta = R\vec{x}_\beta - R\overrightarrow{O'O}_{\beta'}$