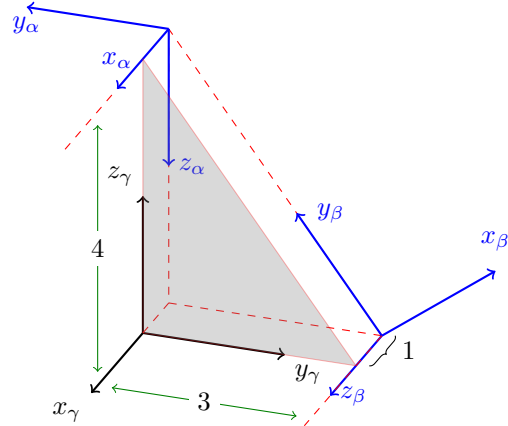# EE 570: Homework 2

1. Consider the three coordinate frames ($\{\alpha\}$, $\{\beta\}$), and $\{\gamma\}$ shown in the diagram below. Following the notation introduced in the class, find the following Cartesian position vectors (denoted by $\vec{r}$) and coordinate transformation matrices (denoted by C).

   (a) $\vec{r}^{\,\gamma}_{\gamma\alpha}$

   (b) $\vec{r}^{\,\gamma}_{\gamma\beta}$

   (c) $\vec{r}^{\,\alpha}_{\gamma\alpha}$

   (d) $\vec{r}^{\,\beta}_{\gamma\beta}$

   (e) C^{γ}_{α}

   (f) C^{γ}_{β}

   (g) C^{α}_{β}

2. Compute the angle-axis equivalents for the rotation matrices in items in 1e to 1g.

3. Compute the quaternion equivalents for the rotation matrices in items in 1e to 1g.