

### Tutorial 5

**Problem 1** Let  $T : \mathbf{R}^2 \longrightarrow \mathbf{R}^3$  be a linear transformation with bases  $\alpha = \{(1, 1), (2, -1)\}$  and  $\beta = \{(1, -1, 1), (1, 1, 0), (0, 1, 0)\}$  respectively. Suppose  $[T]_{\alpha}^{\beta} = \begin{bmatrix} 2 & 1 \\ 1 & -1 \\ 0 & 2 \end{bmatrix}$ .

Let  $\alpha'$  and  $\beta'$  be standard bases for  $\mathbf{R}^2$  and  $\mathbf{R}^3$  respectively. Find  $[T]_{\alpha'}^{\beta'}$ .