

Homework 3

1. Let U be the subspace of \mathbb{R}^5 defined by

$$U = \{(x_1, x_2, x_3, x_4, x_5) \in \mathbb{R}^5 : x_1 + 2x_2 + 3x_3 + 4x_4 + 5x_5 = 0\}.$$

Find a basis of U .

2. Find a basis of \mathbb{R}^4 containing the vectors $(1, 2, 3, 4)$ and $(4, 3, 2, 1)$.

3. Let V be the subspace of \mathbb{R}^4 defined by

$$U = \{(x_1, x_2, x_3, x_4) \in \mathbb{R}^4 : x_1 - x_2 + x_3 - x_4 = 0\}.$$

Let $S = \{(0, 1, 2, 1), (1, 2, 1, 0), (1, 2, 4, 3), (2, 1, 3, 4)\}$ be a spanning subset of V . Reduce S to form a basis of V .