

1. Find a basis for the subspace of \mathbb{R}^3 given by all vectors of the form $\begin{bmatrix} a \\ b \\ c \end{bmatrix}$, where $b = a + c$.

2. Give an example of a two-dimensional subspace of \mathbb{R}^4 .

3. Find a basis for the solution space of the homogeneous system $(\lambda I_n - A)\mathbf{x} = \mathbf{0}$ where $\lambda = 1$ and $A = \begin{bmatrix} 3 & 2 \\ 1 & 2 \end{bmatrix}$.