

Homework 4

- Determine which of the following are subspaces of \mathbb{R}^3 :
 - $W = \{(0, x_2, x_3); x_2 \text{ and } x_3 \text{ are real numbers}\}$
 - $W = \{(a, a - 3b, b); a \text{ and } b \text{ are real numbers}\}$
 - $W = \{(x_1, x_2, x_1x_2); x_1 \text{ and } x_2 \text{ are real numbers}\}$
 - $W = \{(x_1, 1/x_1, x_3); x_1 \text{ and } x_3 \text{ are real numbers}\}$.
- Write each vector as a linear combination of the vectors in S (if possible):
 - $S = \{(2, -1, 3), (5, 0, 4)\}$, $\mathbf{z} = (-1, -2, 2)$, $\mathbf{v} = (8, -\frac{1}{4}, \frac{27}{4})$, $\mathbf{u} = (1, 1, -1)$.
 - $S = \{(2, 0, 7), (2, 4, 5), (2, -12, 13)\}$, $\mathbf{u} = (-1, 5, -6)$, $\mathbf{v} = (-3, 15, 18)$.
- Determine whether the set S is linearly independent or linearly dependent:
 - $S = \{(-2, 2), (3, 5)\}$,
 - $S = \{(0, 0), (1, -1)\}$,
 - $S = \{(1, -4, 1), (6, 3, 2)\}$,
 - $S = \{(1, 1, 1), (2, 2, 2), (3, 3, 3)\}$.