1. Practice problems

Problem 1.1. *Test whether the set of vectors*

$$S = \{(1, 0, -1), (1, 2, 1), (0, -3, 2)\}$$

form a basis for $\mathbb{R}^3$ *or not. If so, express the vector* $(-1, -2, 4)$ *in terms of basis elements.*

Problem 1.2. *Test whether the set of vectors*

$$B = \{(1, 1, 0, 0), (0, 0, 1, 1), (1, 0, 0, 4), (0, 0, 0, 2)\}$$

form a basis for $\mathbb{R}^4$ *or not.*

Problem 1.3. *Test whether the set of vectors*

$$S = \{(1, 2, 1), (2, 9, 0), (3, 3, 4)\}$$

form a basis for $\mathbb{R}^3$ *or not.*

Problem 1.4. *Using Gram-Schmidt Process, construct an orthonormal set of vectors from the following set of linearly independent vectors*

1. $S = \{(2, 2, 1), (-2, 1, 2), (18, 0, 0)\}$.
2. $T = \{(2, -1, 0), (3, 5, 1), (1, 1, 2)\}$.
3. $B = \{(1, 0, -1), (1, 2, 1), (0, -3, 2)\}$.