Supplementary Practice Test 1

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1. Consider the list of vectors $L = \left(\begin{bmatrix} 2 \\ 1 \\ 3 \\ 4 \end{bmatrix}, \begin{bmatrix} 1 \\ 4 \\ 0 \\ 2 \end{bmatrix}, \begin{bmatrix} 0 \\ 2 \\ 1 \\ 3 \end{bmatrix}, \begin{bmatrix} 3 \\ 2 \\ 1 \\ 0 \end{bmatrix}\right)$ in $\mathbb{Z}_5^4$.
   1.1. Describe the span of L.
   1.2. Is L linearly independent in $\mathbb{Z}_5^4$?
   1.3. Determine whether L is a basis for $\mathbb{Z}_5^4$
   1.4. Compute the dimension of the span of L.
2. Is the set

$$U = \left\{ \begin{bmatrix} a_1 \\ a_2 \\ a_3 \end{bmatrix} \in \mathbb{R}^3 : a_2 = a_1 + 2a_1a_3 + a_3 \right\}.$$

   a subspace of $\mathbb{R}^3$?