

Answer on Question #46090 – Math – Linear Algebra

Task:

Consider the following system of equations:

$$\begin{cases} x_1 + 3x_2 + x_3 = 3 \\ x_1 + 5x_2 + 3x_3 = 1 \\ x_1 + 7x_2 + 3x_3 = 1 \end{cases}$$

Check whether the system of equations have a solution or not

Solution:

The system of equations is nonhomogeneous, it has a solution, when $|A| \neq 0$:

$$|A| = \begin{vmatrix} 1 & 3 & 1 \\ 1 & 5 & 3 \\ 1 & 7 & 3 \end{vmatrix} = (5 \cdot 3 - 3 \cdot 7) - (3 - 3) + (7 - 5) = 4 \neq 0.$$

So the system of equations has a solution.