10) SYSTEMS OF LINEAR EQUATIONS
APPLIED MATHEMATICS (FAPPZ)

Basic. Solve the following systems of homogeneous linear equations.

1)

$$
\begin{aligned}
x &- y + z &= 0 \\
2x &+ y - z &= 0 \\
x &- 2y + 3z &= 0
\end{aligned}
$$

2)

$$
\begin{aligned}
2x &- 4y + 2z &= 0 \\
6x &- 12y + 6z &= 0 \\
x &- 2y + z &= 0
\end{aligned}
$$

Check whether the following systems of linear equations have solution.

3)

$$
\begin{aligned}
x &+ y + z &= 2 \\
3x &+ 2y &= 7 \\
2x &+ y - 2z &= 6
\end{aligned}
$$

4)

$$
\begin{aligned}
x &+ y - z &= 4 \\
2x &- y + 4z &= -4 \\
x &+ 2y - 3z &= 5
\end{aligned}
$$

5)

$$
\begin{aligned}
2x &- y - z &= 2 \\
x &+ y + 2z &= 4 \\
3x &+ z &= 6
\end{aligned}
$$

From examinations. Solve the following systems of nonhomogeneous linear equations.

6)

$$
\begin{aligned}
2x &- y + z + v &= 1 \\
&y + 12z &= 2 \\
x &+ y + 22z + v &= 3 \\
x &- 2y - v &= -5
\end{aligned}
$$

7)

$$
\begin{aligned}
x &- 2y - z &= -2 \\
&y - z &= 0 \\
2x &- y + z + v &= 4 \\
x &- y - 2z &= 1
\end{aligned}
$$

8)

$$
\begin{aligned}
x &- 4y + 2z &= 1 \\
4x &- 11y + 13z - 15t &= 4 \\
x &- 3y + 3z - 3t &= 1 \\
3x &- 7y + 11z - 15t &= 3
\end{aligned}
$$

Results. Denote by the symbol $\mathbf{u}$ the vector of solution.

1) $\mathbf{u} = (0, 0, 0)$ 2) $\mathbf{u} \in \big\langle (2, 1, 0), (-1, 0, 1) \big\rangle$

3)   unique solution   4)   no solution

5)   infinitely many solutions   6) $\mathbf{u} = (\frac{17}{7}, \frac{26}{7}, -\frac{1}{7}, 0)$

7)   no solution   8) $\mathbf{u} \in (1, 0, 0, 0) + \big\langle (12, 3, 0, 1), (-6, -1, 1, 0) \big\rangle$