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0.1 64. Hausaufgabe

0.1.1 Geometrie-Buch Seite 22, Aufgabe 1e

Löse das Gleichungssystem:

$$\left|\begin{array}{ccc|c} 2 & -3 & -1 & 4 \\ 3 & -1 & 2 & 5 \\ 3 & -8 & -5 & 5 \end{array}\right|$$

$$\left|\begin{array}{ccc|c} 1 & -\frac{3}{2} & -\frac{1}{2} & 2 \\ 3 & -1 & 2 & 5 \\ 3 & -8 & -5 & 5 \end{array}\right|$$

$$\left|\begin{array}{ccc|c} 1 & -\frac{3}{2} & -\frac{1}{2} & 2 \\ 0 & \frac{7}{2} & \frac{7}{2} & -1 \\ 3 & -8 & -5 & 5 \end{array}\right|$$

$$\left|\begin{array}{ccc|c} 1 & -\frac{3}{2} & -\frac{1}{2} & 2 \\ 0 & \frac{7}{2} & \frac{7}{2} & -1 \\ 0 & -\frac{7}{2} & -\frac{7}{2} & -\frac{7}{2} \end{array}\right|$$

$$\left|\begin{array}{ccc|c} 1 & -\frac{3}{2} & -\frac{1}{2} & 2 \\ 0 & \frac{7}{2} & \frac{7}{2} & -1 \\ 0 & 0 & 0 & -\frac{7}{2} \end{array}\right|$$

Widerspruch; also keine Lösungen

0.1.2 Geometrie-Buch Seite 33, Aufgabe 1

Löse die Gleichungssysteme mit dem Gauß-Verfahren:

$$\left|\begin{array}{rrr|l} -1 & -1 & 1 & 0 \\ 3 & 1 & 2 & 11 \\ -1 & -1 & 4 & 9 \end{array}\right.$$

b)

$$\left|\begin{array}{rrr|l} 1 & 1 & -1 & 0 \\ 0 & -2 & 5 & 11 \\ 0 & 0 & 3 & 9 \end{array}\right.$$

$$\left|\begin{array}{rrr|l} 1 & 1 & -1 & 0 \\ 0 & 1 & -\frac{5}{2} & -\frac{11}{2} \\ 0 & 0 & 3 & 9 \end{array}\right.$$

$x_3 = 3;$

$x_2 = -\frac{11}{2} + \frac{5}{2}x_3 = 2;$

$x_1 = x_3 - x_2 = 1;$

$$\left|\begin{array}{rrr|l} -1 & 1 & 1 & 0 \\ -1 & 4 & 2 & 0 \\ 2 & 2 & 3 & 0 \end{array}\right.$$

d)

$$\left|\begin{array}{rrr|l} 1 & -1 & -1 & 0 \\ 0 & 3 & 1 & 0 \\ 0 & 10 & 7 & 0 \end{array}\right.$$

$$\left|\begin{array}{rrr|l} 1 & -1 & -1 & 0 \\ 0 & 1 & \frac{1}{3} & 0 \\ 0 & 0 & \frac{11}{3} & 0 \end{array}\right.$$

$x_3 = x_2 = x_1 = 0;$

$$\left|\begin{array}{ccc|c} 2 & -3 & -1 & 4 \\ 3 & -1 & 2 & 5 \\ 3 & -8 & -5 & 5 \end{array}\right|$$

$$\left|\begin{array}{ccc|c} 1 & -\frac{3}{2} & -\frac{1}{2} & 2 \\ 0 & 7 & 7 & 0 \\ 0 & -\frac{7}{2} & -\frac{7}{2} & -1 \end{array}\right|$$

e)

$$\left|\begin{array}{ccc|c} 1 & -\frac{3}{2} & -\frac{1}{2} & 2 \\ 0 & 1 & 1 & 0 \\ 0 & -\frac{7}{2} & -\frac{7}{2} & -1 \end{array}\right|$$

$$\left|\begin{array}{ccc|c} 1 & -\frac{3}{2} & -\frac{1}{2} & 2 \\ 0 & 1 & 1 & 0 \\ 0 & 1 & 1 & \frac{2}{7} \end{array}\right|$$

Widerspruch; also keine Lösungen

$$\left|\begin{array}{ccc|c} -1 & 1 & 2 & 0 \\ 1 & -3 & 4 & 0 \\ 2 & -4 & 2 & 0 \end{array}\right|$$

f)

$$\left|\begin{array}{ccc|c} 1 & -1 & -2 & 0 \\ 0 & -2 & 6 & 0 \\ 0 & -2 & 6 & 0 \end{array}\right|$$

$$\left|\begin{array}{ccc|c} 1 & -1 & -2 & 0 \\ 0 & 1 & -3 & 0 \end{array}\right|$$

$x_2 = 3x_3$;

$x_1 = 2x_3 + x_2 = 2x_3 + 3x_3 = 5x_3$;

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$L = \{(x_1, x_2, x_3) | x_1 = 5k \wedge x_2 = 3k \wedge x_3 = k; k \in \mathbb{R}\}$;

$\vec{X} = k \begin{pmatrix} 5 \\ 3 \\ 1 \end{pmatrix}; \quad k \in \mathbb{R};$