LINEARNA ALGEBRA 2020/21
5. VAJE: 2. 11. 2020

1. Reši sistem.
$$\begin{array}{rrrrcr} & -x_2 & -x_3 & -x_4 & = & 2 \\ x_1 & +x_2 & +x_3 & +x_4 & = & 7 \\ 2x_1 & +4x_2 & +x_3 & -2x_4 & = & 1 \\ 3x_1 & +x_2 & -2x_3 & +2x_4 & = & 9 \end{array}$$

2. Prostor rešitev enačb zapiši parametrično.

   a) $\left[\begin{array}{ccc|c} 1 & 1 & 1 & 0 \\ 1 & -1 & -1 & 0 \end{array}\right]$

   b) $\left[\begin{array}{cccc|c} 1 & 3 & 1 & 1 & 3 \\ 6 & 2 & -1 & -2 & 2 \\ 3 & 1 & 2 & -1 & 1 \end{array}\right]$

3. Pokaži:

   a) Linearna kombinacija rešitev homogenega sistema enačb je rešitev istega sistema enačb.

   b) Razlika poljubnih dveh rešitev nehomogenega sistema enačb je rešitev homogenega dela sistema enačb.

4. Obravanavaj sistem.
$$\left[\begin{array}{ccc|c} 1 & 1 & 3 & 2 \\ 1 & 2 & 4 & 3 \\ 1 & 3 & a & b \end{array}\right]$$
   Za katere vrednosti a, b ima sistem eno/neskončno rešitev? Za katere vrednosti sistem nima rešitve.

5. Hkrati reši sistema $2x_1 + 5x_2 = 1$, $x_1 + 3x_2 = 0$ in $2y_1 + 5y_2 = 0$, $y_1 + 3y_2 = 1$. $\left[\begin{array}{cc|cc} 2 & 5 & 1 & 0 \\ 1 & 3 & 0 & 1 \end{array}\right]$.

6. Reši sistem enačb:
$$\left[\begin{array}{ccc|c} 2 & 3 & -2 & -1 \\ 4 & -1 & 0 & 13 \\ 7 & 0 & -2 & 17 \\ 1 & 3 & -2 & -4 \end{array}\right]$$

7. Določi za katere vrednosti a je sistem rešljiv in ga za dobljene vrednosti reši.
$$\left[\begin{array}{cccc|c} 2 & 0 & 2 & 0 & a+1 \\ -1 & 2 & 3 & 1 & -2a \\ 1 & -1 & -1 & 1 & 0 \\ 1 & 1 & 3 & 1 & a-1 \end{array}\right]$$
   Izrazi še rešitev homogenega sistema.

8. Določi posplošeno rešitev predoločenaga sistema enačb

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

9. Parametrično izrazi rešitev sistema enačb.

$$\left[\begin{array}{ccccc|c} 1 & -1 & 0 & 1 & 2 & 0 \\ -2 & 2 & -1 & -4 & -3 & 0 \\ 1 & -1 & 1 & 3 & 1 & 0 \\ -1 & 1 & 1 & 1 & -3 & 0 \end{array}\right],$$

$$\left[\begin{array}{cccccc|c} 1 & -1 & 1 & 3 & 3 & 4 & 2 \\ -2 & 2 & -1 & -3 & -4 & -5 & -1 \\ -1 & 1 & 0 & 0 & -1 & -4 & -5 \\ -1 & 1 & 1 & 3 & 1 & -1 & -2 \end{array}\right].$$

6. Točkam $(1,0),(2,3),(-1,-2)$ priredi premico $y = ax + b$, ki se jim po metodi najmanjših kvadratov najbolj prilega. Najdi tudi parabolo $y = ax^2 + bx + c$, ki se točkam najbolj prilega (Izrazi le sistem s katerim dobiš koeficiente a, b in c.)

$X = \begin{pmatrix} x_1 \\ \vdots \\ x_n \end{pmatrix}$ $Y = \begin{pmatrix} y_1 \\ \vdots \\ y_n \end{pmatrix}$

Iščemo $a, b \in \mathbb{R}$, da bo $\sum_{i=1}^{n} (ax_i + b - y_i)^2$ najmanjša

$X = \begin{pmatrix} 1 \\ 2 \\ -1 \end{pmatrix}$ $Y = \begin{pmatrix} 0 \\ 3 \\ -2 \end{pmatrix}$

$\| aX + b\bar{1} - Y \|^2$

$\bar{1} = \begin{pmatrix} 1 \\ 1 \\ 1 \end{pmatrix}$

Iščemo projekcijo Y na ravnino, ki jo razpenjata X in $\bar{1}$

a in b določimo z enačbama

(★) $\langle aX + b\bar{1} - Y, X \rangle = 0$

$\langle aX + b\bar{1} - Y, \bar{1} \rangle = 0$

Druga možnost: Posplošena rešitev sistema enačb

Če je $z = \begin{pmatrix} z_1 \\ \vdots \\ z_n \end{pmatrix}$ $w = \begin{pmatrix} w_1 \\ \vdots \\ w_n \end{pmatrix}$ $\langle z, w \rangle = w^T z = z^T w$

$A = \begin{pmatrix} x_1 & 1 \\ x_2 & 1 \\ \vdots & \vdots \\ x_n & 1 \end{pmatrix}$

Iščemo posplošeno rešitev sistema

$A \begin{pmatrix} a \\ b \end{pmatrix} = Y$

$A^T A = \begin{pmatrix} \langle x, x \rangle & \langle x, \bar{1} \rangle \\ \langle x, 1 \rangle & \langle 1, 1 \rangle \end{pmatrix}$

$A^T A \begin{pmatrix} a \\ b \end{pmatrix} = \begin{pmatrix} a\langle x, x \rangle + b\langle x, \bar{1} \rangle \\ a\langle x, 1 \rangle + b\langle 1, 1 \rangle \end{pmatrix}$

$A^T Y = \begin{pmatrix} \langle X, Y \rangle \\ \langle \bar{1}, Y \rangle \end{pmatrix}$

$\begin{pmatrix} a\langle x, x \rangle + b\langle x, \bar{1} \rangle \\ a\langle x, 1 \rangle + b\langle 1, 1 \rangle \end{pmatrix} = \begin{pmatrix} \langle X, Y \rangle \\ \langle \bar{1}, Y \rangle \end{pmatrix}$

Primerjaj z (★)

(1)

$$
\begin{array}{rrrrcr}
 & -x_2 & -x_3 & -x_4 & = & 2 \\
x_1 & +x_2 & +x_3 & +x_4 & = & 7 \\
2x_1 & +4x_2 & +x_3 & -2x_4 & = & 1 \\
3x_1 & +x_2 & -2x_3 & +2x_4 & = & 9
\end{array}
$$

① Zaporedno izločanje spremenljivk

$$x_2 = -2 + x_3 - x_4$$

$$x_1 + -2 - x_3 - x_4 + x_3 + x_4 = 7$$

$x_1 \ldots$

② Gaussova eliminacija

$$
\begin{aligned}
x_1 + x_2 + x_3 + x_4 &= 7 \\
0 + x_2 - x_3 - x_4 &= 2 \\
2x_1 + 4x_2 + x_3 - 2x_4 &= 1 \\
3x_1 + x_2 - 2x_3 + 2x_4 &= 9
\end{aligned}
$$

-2, -3

$$
\begin{aligned}
x_1 + x_2 + x_3 + x_4 &= 7 \\
0 + x_2 - x_3 - x_4 &= 2 \\
0 \quad 2x_2 - x_3 - 4x_4 &= -13 \\
0 \quad -2x_2 - 5x_3 - 1x_4 &= -12
\end{aligned}
$$

$$
\left(\begin{array}{cccc|c}
1 & 1 & 1 & 1 & 7 \\
0 & 1 & 1 & 1 & -2 \\
0 & 2 & -1 & -4 & -13 \\
0 & -2 & -5 & -1 & -12
\end{array}\right)
\begin{array}{l} \\ \\ -2 \\ +2 \end{array}
\sim
\left(\begin{array}{cccc|c}
1 & 1 & 1 & 1 & 7 \\
 & 1 & 1 & 1 & -2 \\
 & 0 & -3 & -6 & -9 \\
 & 0 & -3 & 1 & -16
\end{array}\right)
\begin{array}{l} \\ \\ /3 \\ -3 \end{array}
\sim
\left(\begin{array}{cccc|c}
1 & 1 & 1 & 1 & 7 \\
 & 1 & 1 & 1 & -2 \\
 & & 1 & 2 & 3 \\
 & & 0 & 7 & -7
\end{array}\right)
$$

$$
\left(\begin{array}{cccc|c}
1 & 1 & 1 & 1 & 7 \\
 & 1 & 1 & 1 & -2 \\
 & & 1 & 2 & 3 \\
 & & & 1 & -1
\end{array}\right)
\begin{array}{l} -1 \\ -1 \\ -2 \\ \end{array}
$$

$$
\begin{aligned}
& x_1 + x_2 + x_3 + x_4 = 7 \\
x_2 = -6 \quad & x_2 + x_3 + x_4 = -2 \\
x_3 = 5 \quad & x_3 + 2x_4 = 3 \\
& x_4 = -1
\end{aligned}
$$

$$
\left(\begin{array}{cccc|c}
1 & 1 & 1 & 0 & 8 \\
 & 1 & 1 & 0 & -1 \\
 & & 1 & 0 & 5 \\
 & & & 1 & -1
\end{array}\right)
\begin{array}{l} -1 \\ -1 \\ \\ \end{array}
$$

$$
\left(\begin{array}{cccc|c}
1 & 1 & 0 & 0 & 3 \\
 & 1 & 0 & 0 & -6 \\
 & & 1 & 0 & 5 \\
 & & & 1 & -1
\end{array}\right)
\begin{array}{l} -1 \\ \\ \\ \end{array}
\qquad
\left(\begin{array}{cccc|c}
1 & & & & 9 \\
 & 1 & & & -6 \\
 & & 1 & & 5 \\
 & & & 1 & -1
\end{array}\right)
$$

$x_1 = 9$
$x_2 = -6$
$x_3 = 5$
$x_4 = -1$

$$X = \begin{pmatrix} 9 \\ -6 \\ 5 \\ -1 \end{pmatrix}$$

2

a) $\left[\begin{array}{cccc|c} 1 & 1 & 1 & & 0 \\ 1 & -1 & -1 & & 0 \end{array}\right] \rightarrow$ Homogen (množica rešitev gre skozi 0)

b) $\left[\begin{array}{cccc|c} 1 & 3 & 1 & 1 & 3 \\ 6 & 2 & -1 & -2 & 2 \\ 3 & 1 & 2 & -1 & 1 \end{array}\right] \rightarrow$ Nehomogen (-||- ne gre skozi 0)

$$\left[\begin{array}{ccc|c} 1 & 1 & 1 & 0 \\ 1 & -1 & -1 & 0 \end{array}\right] \xrightarrow{-1} \sim \left[\begin{array}{ccc|c} 1 & 1 & 1 & 0 \\ 0 & -2 & -2 & 0 \end{array}\right] \xrightarrow{/2} \sim \left[\begin{array}{ccc|c} 1 & 1 & 1 & 0 \\ & 1 & 1 & 0 \end{array}\right] \xrightarrow{-1} \sim \left[\begin{array}{ccc|c} 1 & 0 & 0 & 0 \\ & 1 & 1 & 0 \end{array}\right]$$

Množica rešitev je premica

$x_1 = 0$

$x_2 + x_3 = 0$

$x_3 = t$

$x_2 = -x_3 = -t$

$$X = \begin{pmatrix} x_1 \\ x_2 \\ x_3 \end{pmatrix} = \begin{pmatrix} 0 \\ -t \\ t \end{pmatrix} = t \begin{pmatrix} 0 \\ -1 \\ 1 \end{pmatrix}$$

t ↳ parameter

$$\left[\begin{array}{cccc|c} 1 & 3 & 1 & 1 & 3 \\ 6 & 2 & -1 & -2 & 2 \\ 3 & 1 & 2 & -1 & 1 \end{array}\right] \xrightarrow{-2} \left[\begin{array}{cccc|c} 1 & 3 & 1 & 1 & 3 \\ 0 & 0 & -5 & 0 & 0 \\ 3 & 1 & 2 & -1 & 1 \end{array}\right] \sim \left[\begin{array}{cccc|c} 1 & 3 & 1 & 1 & 3 \\ 3 & 1 & 2 & -1 & 1 \\ 0 & 0 & 1 & 0 & 0 \end{array}\right] \xrightarrow{-3}$$

$$\left[\begin{array}{cccc|c} 1 & 3 & 1 & 1 & 3 \\ 0 & -8 & -1 & -4 & -8 \\ 0 & 0 & 1 & 0 & 0 \end{array}\right] \xrightarrow{-1,\ +1} \sim \left[\begin{array}{cccc|c} 1 & 3 & 0 & 1 & 3 \\ & -8 & 0 & -4 & -8 \\ & & 1 & 0 & 0 \end{array}\right] \xrightarrow{/-4} \sim \left[\begin{array}{cccc|c} 1 & 3 & 0 & 1 & 3 \\ 0 & 2 & 0 & 1 & 2 \\ & & 1 & 0 & 0 \end{array}\right] \xrightarrow{-\frac{3}{2}}$$

→ Gaussova reducirana oblika

$$\left[\begin{array}{cccc|c} 1 & 0 & 0 & -\frac{1}{2} & 0 \\ 0 & 2 & 0 & 1 & 2 \\ 0 & 0 & 1 & 0 & 0 \end{array}\right]$$

x_4 - vzamemo za parameter

$x_1 - \frac{1}{2} x_4 = 0$

$2x_2 + x_4 = 2$

$x_3 = 0$

$x_4 = t$

$x_2 = -\frac{1}{2} x_4 + 1$

$$\begin{pmatrix} x_1 \\ x_2 \\ x_3 \\ x_4 \end{pmatrix} = \begin{pmatrix} \frac{1}{2} t \\ -\frac{1}{2} t + 1 \\ 0 \\ t \end{pmatrix}$$

$$X = \underbrace{t \begin{pmatrix} \frac{1}{2} \\ -\frac{1}{2} \\ 0 \\ 1 \end{pmatrix}}_{\text{homogeni del}} + \underbrace{\begin{pmatrix} 0 \\ 1 \\ 0 \\ 0 \end{pmatrix}}_{\text{partikularni del}}$$

Homogen del je rešitev $\rightarrow \left[\begin{array}{cccc|c} 1 & 3 & 1 & 1 & 0 \\ 6 & 2 & -1 & -2 & 0 \\ 3 & 1 & 2 & -1 & 0 \end{array}\right]$

3. Pokaži:

a) Linearna kombinacija rešitev homogenega sistema enačb je rešitev istega sistema enačb.

b) Razlika poljubnih dveh rešitev nehomogenega sistema enačb je rešitev homogenega dela sistema enačb.

a) $(A|0)$ $\quad x_1 \quad x_2$ — rešitvi $\quad \alpha x_1 + \beta x_2$ tudi reši sistem

$$A = \begin{pmatrix} a_{11} & a_{12} & \cdots & a_{1n} \\ a_{21} & a_{22} & \cdots & a_{2n} \\ \vdots & \vdots & \ddots & \\ a_{m1} & a_{m2} & \cdots & a_{mn} \end{pmatrix} \qquad x_1 = \begin{pmatrix} x_{11} \\ x_{12} \\ \vdots \\ x_{1n} \end{pmatrix} \qquad x_2 = \begin{pmatrix} x_{21} \\ x_{22} \\ \vdots \\ x_{2n} \end{pmatrix}$$

1. $a_{11}x_{11} + a_{12}x_{12} \cdots + a_{1n}x_{1n} = 0 \qquad a_{11}x_{21} + a_{12}x_{22} \cdots + a_{1n}x_{2n} = 0$

$$a_{11}x_{11} + a_{11}x_{21} + \overset{a_{12}x_{12}+a_{12}x_{22}}{\cdots} + a_{1n}x_{1n} + a_{1n}x_{2n} = 0$$

$$a_{11}(x_{11} + x_{12}) + a_{12}(x_{12} + x_{22}) + \cdots a_{1n}(x_{1n} + x_{2n}) = 0$$

Enako velja v vseh vrsticah.

$$x_1 + x_2 = \begin{pmatrix} x_{11} + x_{21} \\ x_{12} + x_{22} \\ \vdots \\ x_{1n} + x_{2n} \end{pmatrix} \text{ je rešitev}$$

$(A|0) \qquad Ax = 0$

$Ax_1 = 0 \qquad \alpha A x_1 = 0 \qquad A(\alpha x_1 + \beta x_2)$

$Ax_2 = 0 \qquad \beta A x_1 = 0 \qquad \| $

$\alpha A x_1 + \beta A x_2 = 0 + 0$

$$\alpha(a_{11}x_{11} + a_{12}x_{12} \cdots + a_{1n}x_{1n}) = 0$$

$$\|$$

$$a_{11}(\alpha x_{11}) + a_{12}(\alpha x_{12}) + \cdots + a_{1n}(\alpha x_{1n}) = 0 \qquad \alpha x_1 = \begin{pmatrix} \alpha x_{11} \\ \vdots \\ \alpha x_{1n} \end{pmatrix} \text{ je rešitev}$$

b) $Ax = b \qquad x_1, x_2 \qquad Ax_1 = b \quad Ax_2 = b$

$Ax = 0$ – homogeni del $\qquad x_1 - x_2$ je rešitev hom. dela

$$A(x_1 - x_2) = Ax_1 - Ax_2 = b - b = 0$$

$Ax = b \qquad \underline{Ax_1 = b} \qquad Ah = 0$, potem je $A(x_1 + h) = b$

4. Obravanavaj sistem.

$$\left[\begin{array}{ccc|c} 1 & 1 & 3 & 2 \\ 1 & 2 & 4 & 3 \\ 1 & 3 & a & b \end{array}\right]$$

Za katere vrednosti a, b ima sistem eno/neskončno rešitev? Za katere vrednosti sistem nima rešitve.

$$\left[\begin{array}{ccc|c} 1 & 1 & 3 & 2 \\ 1 & 2 & 4 & 3 \\ 1 & 3 & a & b \end{array}\right] \begin{array}{c} \\ -1 \\ -1 \end{array} \sim \left[\begin{array}{ccc|c} 1 & 1 & 3 & 2 \\ 0 & 1 & 1 & 1 \\ 0 & 2 & a-3 & b-2 \end{array}\right] \begin{array}{c} \\ -2 \\ \end{array}$$

$$\left[\begin{array}{ccc|c} 1 & 1 & 3 & 2 \\ 0 & 1 & 1 & 1 \\ 0 & 0 & a-5 & b-4 \end{array}\right]$$

1

$a=5$

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

1.1

$b=4$

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

$x_1 + 2x_3 = 1$

$x_2 + x_3 = 1$

$x_3 = t$

$x_1 = 1 - 2t$

$x_2 = 1 - t$

$$x = \begin{pmatrix} -2 \\ -1 \\ 1 \end{pmatrix} t + \begin{pmatrix} 1 \\ 1 \\ 0 \end{pmatrix}$$

$(a=5 \quad b=4)$

neskončno rešitev

1.2

$b \neq 4$

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

$0 = b-4$ X

$b-4 \neq 0$

ni rešitve $(a=5 \quad b \neq 4)$

2

$a \neq 5$

$$\left[\begin{array}{ccc|c} 1 & 0 & 2 & 1 \\ 0 & 1 & 1 & 1 \\ 0 & 0 & 1 & \frac{b-4}{a-5} \end{array}\right] \sim \left[\begin{array}{ccc|c} 1 & 0 & 0 & 1-2\frac{b-4}{a-5} \\ 0 & 1 & 0 & 1-\frac{b-4}{a-5} \\ 0 & 0 & 1 & \frac{b-4}{a-5} \end{array}\right]$$

$$X = \begin{pmatrix} 1-2\frac{b-4}{a-5} \\ 1-\frac{b-4}{a-5} \\ \frac{b-4}{a-5} \end{pmatrix}$$

imamo enolično rešitev

$a \neq 5 \quad b$ poljuben

5. Hkrati reši sistema $2x_1+5x_2=1$, $x_1+3x_2=0$ in $2y_1+5y_2=0$, $y_1+3y_2=1$.
$\left[\begin{array}{cc|cc} 2 & 5 & 1 & 0 \\ 1 & 3 & 0 & 1 \end{array}\right]$.

$$\begin{aligned} 2x_1+5x_2 &= 1, \\ x_1+3x_2 &= 0 \end{aligned} \qquad \begin{aligned} 2y_1+5y_2 &= 0, \\ y_1+3y_2 &= 1. \end{aligned}$$

$$\left[\begin{array}{cc|cc} 2 & 5 & 1 & 0 \\ 1 & 3 & 0 & 1 \end{array}\right] \sim \left[\begin{array}{cc|cc} 1 & 3 & 0 & 1 \\ 2 & 5 & 1 & 0 \end{array}\right] \sim \left[\begin{array}{cc|cc} 1 & 3 & 0 & 1 \\ 0 & -1 & 1 & -2 \end{array}\right] \sim \left[\begin{array}{cc|cc} 1 & 3 & 0 & 1 \\ 0 & 1 & -1 & 2 \end{array}\right]$$

$$\sim \left[\begin{array}{cc|cc} 1 & 0 & 3 & -5 \\ 0 & 1 & -1 & 2 \end{array}\right] \qquad x = \begin{pmatrix} 3 \\ -1 \end{pmatrix} \qquad y = \begin{pmatrix} -5 \\ 2 \end{pmatrix}$$

$\begin{pmatrix} 3 & -5 \\ -1 & 2 \end{pmatrix}$ je inverz $\begin{pmatrix} 2 & 5 \\ 1 & 3 \end{pmatrix}$

6. Reši sistem enačb:

$$\left[\begin{array}{ccc|c} 2 & 3 & -2 & -1 \\ 4 & -1 & 0 & 13 \\ 7 & 0 & -2 & 17 \\ 1 & 3 & -2 & -4 \end{array}\right]$$

$$\left[\begin{array}{ccc|c} 1 & 3 & -2 & -4 \\ 2 & 3 & -2 & -1 \\ 4 & -1 & 0 & 13 \\ 7 & 0 & -2 & 17 \end{array}\right] \begin{array}{c} \\ -2 \\ -4 \\ -7 \end{array} \sim \left[\begin{array}{ccc|c} 1 & 3 & -2 & -4 \\ 0 & -3 & 2 & 7 \\ 0 & -13 & 8 & 29 \\ 0 & -21 & 12 & 45 \end{array}\right] \begin{array}{c} \\ -7 \\ \\ \\ \end{array} \sim \left[\begin{array}{ccc|c} 1 & 3 & -2 & -4 \\ 0 & 3 & -2 & -7 \\ 0 & -13 & 8 & 29 \\ 0 & 0 & -2 & -4 \end{array}\right] \begin{array}{c} \\ \\ \\ /-2 \end{array}$$

$$\left[\begin{array}{ccc|c} 1 & 3 & -2 & -4 \\ 0 & 3 & -2 & -7 \\ 0 & -13 & 8 & 29 \\ 0 & 0 & 1 & 2 \end{array}\right] \begin{array}{c} -1 \\ \\ -2 \\ -8 \end{array} \sim \left[\begin{array}{ccc|c} 1 & 0 & 0 & 3 \\ 0 & 3 & 0 & -3 \\ 0 & -13 & 0 & 13 \\ 0 & 0 & 1 & 2 \end{array}\right] \begin{array}{c} \\ /3 \\ /13 \\ \\ \end{array} \sim \left[\begin{array}{ccc|c} 1 & 0 & 0 & 3 \\ 0 & 1 & 0 & -1 \\ 0 & 1 & 0 & -1 \\ 0 & 0 & 1 & 2 \end{array}\right] \cdot (-1)$$

$$\sim \left[\begin{array}{ccc|c} 1 & 0 & 0 & 3 \\ 0 & 1 & 0 & -1 \\ 0 & 0 & 1 & 2 \\ 0 & 0 & 0 & 0 \end{array}\right] \qquad x = \begin{pmatrix} 3 \\ -1 \\ 2 \end{pmatrix}$$

Če bi iskali posplošeno rešitev, bi dobili isto.
(Ne bi vedeli, da je tudi dejanska rešitev.)