2. $\left(\begin{array}{ccc|c} 1 & -2i & -(5-3i) & 1 \\ 1 & -2i & -(5+3i) & 11i \\ 2 & -4i & -10 & (1+11i) \end{array}\right) \begin{array}{l} \cdot(-1) \\ + \\ \cdot(-2) \\ + \end{array} \sim \left(\begin{array}{ccc|c} 1 & -2i & -(5-3i) & 1 \\ 0 & 0 & -6i & 11i-1 \\ 0 & 0 & -6i & 11i-1 \end{array}\right) \begin{array}{l} \\ \cdot(-1) \\ :6 \end{array}$

$\sim \left(\begin{array}{ccc|c} 1 & -2i & -(5-3i) & 1 \\ 0 & 0 & 0 & 0 \\ 0 & 0 & 1 & -\frac{11}{6}-\frac{i}{6} \end{array}\right) \begin{array}{l} + \\ \cdot(5-3i) \end{array} \sim \left(\begin{array}{ccc|c} 1 & -2i & 0 & -\frac{26}{3}+\frac{14i}{3} \\ 0 & 0 & 0 & 0 \\ 0 & 0 & 1 & -\frac{11}{6}-\frac{i}{6} \end{array}\right)$

$x_2 = p \quad | \, p \in \mathbb{C}$

$x_3 = -\frac{11+i}{6}$

$x_1 - 2ip = -\frac{26}{3} + \frac{14i}{3} \Rightarrow x_1 = -\frac{26}{3} + \frac{14i}{3} + 2ip$

$$\begin{pmatrix} x_1 \\ x_2 \\ x_3 \end{pmatrix} = \begin{pmatrix} -\frac{26}{3} + \frac{14i}{3} + 2ip \\ p \\ -\frac{11+i}{6} \end{pmatrix}$$

Zavadzan

Zavadkan

3.

a)

uvažujme $\alpha = -5$ a $\beta = 1$, potom:

$$-5 \cdot [1,2,3,3,3] + 1[1,0,2,0,1] = [-4,-10,-13,-15,x]$$

$$[-5+1, -10+0, -15+2, -15+0, -15+1] = [-4,-10,-13,-15,x]$$

$$[-4,-10,-13,-15,-14] = [-4,-10,-13,-15,x]$$

teda $x = -14$ riešenie: $\alpha = -5, \beta = 1, x = -14$

pri pohlade na zadanie vieme o 2. prvku povedať, že:

$2\alpha + 0\beta = -10 \Rightarrow \underline{\underline{\alpha = -5}}$ potom dosadením do

$1\alpha + 1\beta = -4$ (z 1. prvku) $\Rightarrow -5 + \beta = -4 \Rightarrow \underline{\underline{\beta = 1}}$

b)

$$\gamma[1,2,3,3,3] + \delta[-4,-10,-13,-15,x] = [1,0,2,0,1]$$

pre 1. prvok platí:

$\gamma + (-4)\delta = 1 \Rightarrow \gamma = 1 + 4\delta$

pre 2. prvok

$2\gamma - 10\delta = 0$

$2(1+4\delta) - 10\delta = 0$

$2 + 8\delta - 10\delta = 0$

$2\delta = 2$

$\underline{\underline{\delta = 1}} \Rightarrow \boxed{\gamma - 4 = 1}$ z prvej rovnice

$\underline{\underline{\gamma = 5}}$

potom pre x platí

$5 \cdot 3 + x = 1$

$\underline{\underline{x = -14}}$

Zavadzan

c)

$$n[1,0,2,0,1] + \varepsilon[-4,-10,-13,-15,x] = 2[1,2,3,3,3]$$

$$[n-4\varepsilon, -10\varepsilon, 2n-13\varepsilon, -15\varepsilon, n+x\varepsilon] = [2,4,6,6,6]$$

Z 2. prvku vieme, že:

$$-10\varepsilon = 4$$

$$\varepsilon = -\frac{4}{10} = -0{,}4$$

Z 1. prvku potom vieme:

$$n-4\cdot(-0{,}4) = 2$$

$$n+1{,}6 = 2$$

$$n = 0{,}4$$

stačí nájsť také x, že neplatí:

$$0{,}4-0{,}4x = 6$$

také x je napr. 0, lebo $\underline{\underline{x=0}}$

$$0{,}4 \neq 6$$

d) $\vec{s} = [x_1, x_2, x_3, x_4, x_5]$

potom:

$\vec{u}\cdot\vec{s} = -1$

$x_1+2x_2+3x_3+3x_4+3x_5 = -1$

$\vec{v}\cdot\vec{s} = 1$

$x_1 + \quad + 2x_3 + \quad + x_5 = 1$

riešime maticou:

$$\left(\begin{array}{ccccc|c} 1 & 0 & 2 & 0 & 1 & 1 \\ 1 & 2 & 3 & 3 & 3 & -1 \end{array}\right) \sim \left(\begin{array}{ccccc|c} 1 & 0 & 2 & 0 & 1 & 1 \\ 0 & 2 & 1 & 3 & 2 & -2 \end{array}\right) \sim \left(\begin{array}{ccccc|c} 1 & 0 & 2 & 0 & 1 & 1 \\ 0 & 1 & 0{,}5 & 1{,}5 & 1 & -1 \end{array}\right)$$

$x_3 = p$ $\quad p,q,r \in R$

$x_4 = q$

$x_5 = r$

$x_1+2x_3+x_5 = 1$

$x_1 = 1-2x_3-x_5$

$x_2 = -0{,}5x_3 - 1{,}5x_4 - x_5 - 1$

$$\underline{\underline{\begin{pmatrix} x_1 \\ x_2 \\ x_3 \\ x_4 \\ x_5 \end{pmatrix} = \begin{pmatrix} 1-2p-r \\ -0{,}5p-1{,}5q-r-1 \\ p \\ q \\ r \end{pmatrix}}}$$