

5. mājasdarbs.

1. uzdevums

Mans risinājums

5. mājas darbs

1) $B = \begin{bmatrix} 0 & 1 & 1 \\ 3 & -2 & 2 \\ 0 & -2 & 4 \end{bmatrix}$

$R_1 \leftrightarrow R_2$

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

$R_1 + \frac{2}{3}R_2$

$$\begin{array}{ccc|ccc} 1 & 0 & \frac{5}{3} & \frac{2}{3} & \frac{1}{3} & 0 \\ 0 & 1 & 1 & 1 & 0 & 0 \\ 0 & -2 & 4 & 0 & 0 & 1 \end{array} \rightarrow \begin{array}{ccc|ccc} 1 & 0 & \frac{5}{3} & \frac{2}{3} & \frac{1}{3} & 0 \\ 0 & 1 & 1 & 1 & 0 & 0 \\ 0 & 0 & 6 & 2 & 0 & 1 \end{array}$$

$R_3 + 2R_2$

$$\begin{array}{ccc|ccc} 1 & 0 & \frac{5}{3} & \frac{2}{3} & \frac{1}{3} & 0 \\ 0 & 1 & 1 & 1 & 0 & 0 \\ 0 & 0 & 6 & 2 & 0 & 1 \end{array} \rightarrow \begin{array}{ccc|ccc} 1 & 0 & \frac{5}{3} & \frac{2}{3} & \frac{1}{3} & 0 \\ 0 & 1 & 1 & 1 & 0 & 0 \\ 0 & 0 & 6 & 2 & 0 & 1 \end{array}$$

$R_1 - \frac{5}{6}R_3$

$$\begin{array}{ccc|ccc} 1 & 0 & 0 & \frac{2}{9} & \frac{1}{3} & -\frac{2}{9} \\ 0 & 1 & 1 & 1 & 0 & 0 \\ 0 & 0 & 6 & 2 & 0 & 1 \end{array} \rightarrow \begin{array}{ccc|ccc} 1 & 0 & 0 & \frac{2}{9} & \frac{1}{3} & -\frac{2}{9} \\ 0 & 1 & 1 & 1 & 0 & 0 \\ 0 & 0 & 6 & 2 & 0 & 1 \end{array}$$

$R_2 - R_3$

$$\begin{array}{ccc|ccc} 1 & 0 & 0 & \frac{2}{9} & \frac{1}{3} & -\frac{2}{9} \\ 0 & 1 & 0 & \frac{2}{3} & 0 & -\frac{1}{6} \\ 0 & 0 & 6 & 2 & 0 & 1 \end{array}$$

$B^{-1} = \begin{bmatrix} \frac{2}{9} & \frac{1}{3} & -\frac{2}{9} \\ \frac{2}{3} & 0 & -\frac{1}{6} \\ \frac{1}{3} & 0 & \frac{1}{6} \end{bmatrix}$

Wolfram atrisinājums

invert {0,1,1},{3,-2,2},{0,-2,4}

NATURAL LANGUAGE MATH INPUT EXTENDED KEYBOARD EXAMPLES UPLOAD RANDOM

Assuming "invert" is referring to linear algebra | Use as a function instead

Input

$$\begin{pmatrix} 0 & 1 & 1 \\ 3 & -2 & 2 \\ 0 & -2 & 4 \end{pmatrix}^{-1} \quad (\text{matrix inverse})$$

Result

$$\frac{1}{18} \begin{pmatrix} 4 & 6 & -4 \\ 12 & 0 & -3 \\ 6 & 0 & 3 \end{pmatrix}$$

Expanded form

$$\begin{pmatrix} \frac{2}{9} & \frac{1}{3} & -\frac{2}{9} \\ \frac{2}{3} & 0 & -\frac{1}{6} \\ \frac{1}{3} & 0 & \frac{1}{6} \end{pmatrix}$$

Approximate form Step-by-step solution

2. uzdevums

Mans risinājums

$$\begin{aligned}
 \textcircled{2} \quad X &= B^{-1} A \begin{pmatrix} \frac{2}{9} & \frac{1}{3} & \frac{2}{9} \\ \frac{2}{3} & 0 & \frac{1}{6} \\ \frac{1}{3} & 0 & \frac{1}{6} \end{pmatrix} \begin{pmatrix} 0 & 2 & 0 \\ 1 & 1 & 0 \\ 0 & 1 & 2 \end{pmatrix} \\
 X &= \begin{pmatrix} \frac{2}{9}(0) + \frac{1}{3}(2) + \frac{2}{9}(0) & \frac{2}{9}(2) + \frac{1}{3}(1) - \frac{2}{9}(1) & \frac{2}{9}(0) + \frac{1}{3}(0) - \frac{2}{9}(2) \\ \frac{2}{3}(0) + 0(2) - \frac{1}{6}(0) & \frac{2}{3}(2) + 0(1) - \frac{1}{6}(1) & \frac{2}{3}(0) + 0(0) - \frac{1}{6}(2) \\ \frac{1}{3}(0) + 0(1) + \frac{1}{6}(0) & \frac{1}{3}(2) + 0(1) + \frac{1}{6}(1) & \frac{1}{3}(0) + 0(0) + \frac{1}{6}(2) \end{pmatrix} = \\
 &= \begin{pmatrix} \frac{2}{9} & \frac{5}{9} & -\frac{2}{9} \\ 0 & \frac{11}{6} & -\frac{1}{3} \\ 0 & \frac{5}{6} & \frac{1}{3} \end{pmatrix} \\
 Y &= A B^{-1} = \begin{pmatrix} 0 & 2 & 0 \\ 1 & 1 & 0 \\ 0 & 1 & 2 \end{pmatrix} \begin{pmatrix} \frac{2}{9} & \frac{1}{3} & -\frac{2}{9} \\ \frac{2}{3} & 0 & -\frac{1}{6} \\ \frac{1}{3} & 0 & \frac{1}{6} \end{pmatrix} \\
 Y &= \begin{pmatrix} 0(0) + 2(\frac{2}{9}) + 0(\frac{1}{3}) & 0(2) + 2(\frac{1}{3}) + 0(-\frac{2}{9}) & 0(0) + 2(-\frac{2}{9}) + 0(\frac{1}{3}) \\ 1(0) + 1(\frac{2}{9}) + 0(\frac{1}{3}) & 1(2) + 1(\frac{1}{3}) + 0(-\frac{2}{9}) & 1(0) + 1(-\frac{2}{9}) + 0(\frac{1}{3}) \\ 0(0) + 1(\frac{2}{9}) + 2(\frac{1}{3}) & 0(2) + 1(\frac{1}{3}) + 2(-\frac{2}{9}) & 0(0) + 1(-\frac{2}{9}) + 2(\frac{1}{3}) \end{pmatrix} = \\
 &= \begin{pmatrix} \frac{4}{9} & 0 & -\frac{4}{9} \\ \frac{2}{9} & \frac{1}{3} & -\frac{2}{9} \\ \frac{4}{9} & 0 & \frac{2}{9} \end{pmatrix}
 \end{aligned}$$

Wolfram risinājums

$\{\{2/9, 1/3, -2/9\}, \{2/3, 0, -1/6\}, \{1/3, 0, 1/6\}\} * \{\{0, 2, 0\}, \{1, 1, 0\}, \{0, 1, 2\}\}$

NATURAL LANGUAGE 🔢 MATH INPUT
⌨️ EXTENDED KEYBOARD
📖 EXAMPLES
📤 UPLOAD
🎲 RANDOM

Input

$$\begin{pmatrix} \frac{2}{9} & \frac{1}{3} & -\frac{2}{9} \\ \frac{2}{3} & 0 & -\frac{1}{6} \\ \frac{1}{3} & 0 & \frac{1}{6} \end{pmatrix} \cdot \begin{pmatrix} 0 & 2 & 0 \\ 1 & 1 & 0 \\ 0 & 1 & 2 \end{pmatrix}$$

Result

$$\begin{pmatrix} \frac{4}{9} & 0 & -\frac{4}{9} \\ \frac{2}{9} & \frac{1}{3} & -\frac{2}{9} \\ \frac{4}{9} & 0 & \frac{2}{9} \end{pmatrix}$$

Approximate forms ✓ Step-by-step solution

Dimensions

3 (rows) × 3 (columns)

Matrix plot

$\{(0, 2, 0), \{1, 1, 0\}, \{0, 1, 2\}\} * \{(2/9, 1/3, -2/9), \{2/3, 0, -1/6\}, \{1/3, 0, 1/6\}\}$

NATURAL LANGUAGE \int_0^{π} MATH INPUT EXTENDED KEYBOARD EXAMPLES UPLOAD RANDOM

Input

$$\begin{pmatrix} 0 & 2 & 0 \\ 1 & 1 & 0 \\ 0 & 1 & 2 \end{pmatrix} \cdot \begin{pmatrix} \frac{2}{9} & \frac{1}{3} & -\frac{2}{9} \\ \frac{2}{3} & 0 & -\frac{1}{6} \\ \frac{1}{3} & 0 & \frac{1}{6} \end{pmatrix}$$

Result

$$\begin{pmatrix} \frac{4}{3} & 0 & -\frac{1}{3} \\ \frac{8}{9} & \frac{1}{3} & -\frac{7}{18} \\ \frac{4}{3} & 0 & \frac{1}{6} \end{pmatrix}$$

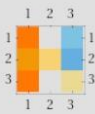
Approximate forms ☒ Step-by-step solution

Dimensions

3 (rows) \times 3 (columns)

☒ Step-by-step solution

Matrix plot



3. uzdevums

Mans risinājums

Savlaicīgi pārbaudīju vai rezultāts veidojas pareizs, izrādās nebija un mazliet izlaboju.

③ $A_1 = \{x - 3y = 3, -3x + 4y = 2\} = \begin{pmatrix} 1 & -3 \\ -3 & 4 \end{pmatrix}$

$A_2 = \{2x - 3y = 1, -3x + 4y = 1\} = \begin{pmatrix} 2 & -3 \\ -3 & 4 \end{pmatrix}$

$B^{-1} = \text{kopīgā inversā matrica} = (A_1 + A_2)^{-1} =$

$= \left(\begin{pmatrix} 1 & -3 \\ -3 & 4 \end{pmatrix} + \begin{pmatrix} 2 & -3 \\ -3 & 4 \end{pmatrix} \right)^{-1} = \begin{pmatrix} 3 & -6 \\ -6 & 8 \end{pmatrix}^{-1} =$

$= \frac{1}{(3 \cdot 8) - (-6 \cdot -6)} \begin{pmatrix} 8 & 6 \\ 6 & 3 \end{pmatrix} = \frac{1}{24} \begin{pmatrix} 8 & 6 \\ 6 & 3 \end{pmatrix} =$

$= \begin{pmatrix} \frac{1}{3} & \frac{1}{4} \\ \frac{1}{4} & \frac{1}{8} \end{pmatrix} \neq \begin{pmatrix} -2 & -1,5 \\ -1,5 & -1 \end{pmatrix}$

nav ne. jāsamana *nav ne. jāsamana*

~~$X_1 = B^{-1} A_1 = \begin{pmatrix} \frac{1}{3} & \frac{1}{4} \\ \frac{1}{4} & \frac{1}{8} \end{pmatrix} \begin{pmatrix} 3 \\ 2 \end{pmatrix} =$~~

$X_1 = B^{-1} A_1 = \begin{pmatrix} -2 & -1,5 \\ -1,5 & -1 \end{pmatrix} \begin{pmatrix} 3 \\ 2 \end{pmatrix} =$

$= \begin{pmatrix} -9 \\ -1,5 \\ -1,5 \\ -2 \end{pmatrix}$

$X_2 = B^{-1} A_2 = \begin{pmatrix} -2 & -1,5 \\ -1,5 & -1 \end{pmatrix} \begin{pmatrix} 1 \\ 1 \end{pmatrix} = \begin{pmatrix} -3,5 \\ -2,5 \end{pmatrix}$

Wolfram risinājums:

Kopīgā inversā matrica

FROM THE MAKERS OF WOLFRAM LANGUAGE AND MATHEMATICA

WolframAlpha

inverse({{2,-3},{-3,4}}+{{2,-3},{-3,4}})

NATURAL LANGUAGE MATH INPUT EXTENDED KEYBOARD EXAMPLES UPLOAD RANDOM

Input

$$\left(\begin{pmatrix} 2 & -3 \\ -3 & 4 \end{pmatrix} + \begin{pmatrix} 2 & -3 \\ -3 & 4 \end{pmatrix} \right)^{-1} \text{ (matrix inverse)}$$

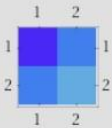
Result Exact form Step-by-step solution

$$\begin{pmatrix} -2 & -1.5 \\ -1.5 & -1 \end{pmatrix}$$

Dimensions Step-by-step solution

2 (rows) × 2 (columns)

Matrix plot



Properties

X₁ risinājums

FROM THE MAKERS OF WOLFRAM LANGUAGE AND MATHEMATICA

WolframAlpha

{{-2, -3/2}, {-3/2, -1}}*{{3},{2}}

NATURAL LANGUAGE MATH INPUT EXTENDED KEYBOARD EXAMPLES UPLOAD RANDOM

Input

$$\begin{pmatrix} -2 & -\frac{3}{2} \\ -\frac{3}{2} & -1 \end{pmatrix} \begin{pmatrix} 3 \\ 2 \end{pmatrix}$$

Result Decimal forms Step-by-step solution


$$\begin{pmatrix} -9 \\ -\frac{13}{2} \end{pmatrix}$$

Dimensions Step-by-step solution



2 (rows) × 1 (column)





X₂ risinājums

FROM THE MAKERS OF WOLFRAM LANGUAGE AND MATHEMATICA



$\{-2, -3/2\}, \{-3/2, -1\} * \{1\}, \{1\}$

 NATURAL LANGUAGE  MATH INPUT

 EXTENDED KEYBOARD  EXAMPLES  UPLOAD  RANDOM

Input

$$\begin{pmatrix} -2 & -\frac{3}{2} \\ -\frac{3}{2} & -1 \end{pmatrix} \cdot \begin{pmatrix} 1 \\ 1 \end{pmatrix}$$

Result

$$\begin{pmatrix} -\frac{7}{2} \\ -\frac{5}{2} \end{pmatrix}$$

Dimensions