

1. mājasdarbs - Gausa metode

Lekcijā tika stāstīts par kursa aprakstu, pieminēts kas ir jādara, lai būtu sekmīgs šajā kursā. Ne pa tēmu, bet tika arī pieminēts, kāds ir pasniedzēja vecums, kā arī cik gadi ir pavadīti mācot citus skolēnus/studentus. Tika atmiņā atgādinātas savienojamas un nesavienojamas sistēmas. Tika arī iesākts runāt par Gausa metodi, kā to pielietot.

1. Gausa metode

1. uzrakstīt 4×4 lineāru vienādojumu

$$\begin{aligned} a_{11}x_1 + a_{12}x_2 + a_{13}x_3 + a_{14}x_4 &= b_1 \\ a_{21}x_1 + a_{22}x_2 + a_{23}x_3 + a_{24}x_4 &= b_2 \\ a_{31}x_1 + a_{32}x_2 + a_{33}x_3 + a_{34}x_4 &= b_3 \\ a_{41}x_1 + a_{42}x_2 + a_{43}x_3 + a_{44}x_4 &= b_4 \end{aligned}$$

2. Atzinot Gausa-Jordana vienādojuma sistēmu

$$\begin{array}{ccc|c} 1 & -3 & 2 & 5 & 2 \\ 2 & -7 & 2 & 8 & 5 \\ 3 & 2 & 2 & 2 & 2 \\ 4 & 5 & 2 & -1 & 2 \end{array} \xRightarrow{R_2 - 2R_1} \begin{array}{ccc|c} 1 & -3 & 2 & 5 & 2 \\ 0 & -1 & -2 & -2 & 1 \\ 3 & 2 & 2 & 2 & 2 \\ 4 & 5 & 2 & -1 & 2 \end{array} \xRightarrow{R_3 - 3R_1, R_4 - 4R_1} \begin{array}{ccc|c} 1 & -3 & 2 & 5 & 2 \\ 0 & -1 & -2 & -2 & 1 \\ 0 & 11 & -4 & -13 & -4 \\ 0 & 17 & -6 & -21 & -6 \end{array}$$

$$\xRightarrow{R_4 + 17R_2} \begin{array}{ccc|c} 1 & -3 & 2 & 5 & 2 \\ 0 & -1 & -2 & -2 & 1 \\ 0 & 11 & -4 & -13 & -4 \\ 0 & 0 & -40 & -59 & 11 \end{array} \xRightarrow{R_4 - 20R_3} \begin{array}{ccc|c} 1 & -3 & 2 & 5 & 2 \\ 0 & -1 & -2 & -2 & 1 \\ 0 & 0 & -26 & -35 & 7 \\ 0 & 0 & 0 & \frac{15}{13} & \frac{3}{13} \end{array}$$

$$\xRightarrow{R_4 = R_4 \cdot \frac{-13}{15}} \begin{array}{ccc|c} 1 & -3 & 2 & 5 & 2 \\ 0 & -1 & -2 & -2 & 1 \\ 0 & 0 & -26 & -35 & 7 \\ 0 & 0 & 0 & 1 & -\frac{1}{3} \end{array} \xRightarrow{R_3 + 35R_4, R_2 + 2R_4} \begin{array}{ccc|c} 1 & -3 & 2 & 5 & 2 \\ 0 & -1 & -2 & -2 & 1 \\ 0 & 0 & -26 & 0 & 0 \\ 0 & 0 & 0 & 1 & -\frac{1}{3} \end{array}$$

$$\xRightarrow{R_3 \cdot -\frac{1}{26}} \begin{array}{ccc|c} 1 & -3 & 2 & 5 & 2 \\ 0 & -1 & -2 & -2 & 1 \\ 0 & 0 & 1 & 0 & 0 \\ 0 & 0 & 0 & 1 & -\frac{1}{3} \end{array} \xRightarrow{R_2 + 2R_3, R_1 + 3R_2} \begin{array}{ccc|c} 1 & -3 & 2 & 5 & 2 \\ 0 & -1 & 0 & 0 & \frac{2}{3} \\ 0 & 0 & 1 & 0 & 0 \\ 0 & 0 & 0 & 1 & -\frac{1}{3} \end{array}$$

$$\xRightarrow{R_1 + 3R_2} \begin{array}{ccc|c} 1 & 0 & 2 & 5 & \frac{10}{3} \\ 0 & -1 & 0 & 0 & \frac{2}{3} \\ 0 & 0 & 1 & 0 & 0 \\ 0 & 0 & 0 & 1 & -\frac{1}{3} \end{array} \xRightarrow{R_1 - 2R_3} \begin{array}{ccc|c} 1 & 0 & 0 & 5 & \frac{10}{3} \\ 0 & -1 & 0 & 0 & \frac{2}{3} \\ 0 & 0 & 1 & 0 & 0 \\ 0 & 0 & 0 & 1 & -\frac{1}{3} \end{array} \xRightarrow{R_1 \cdot \frac{3}{5}, R_2 \cdot -3} \begin{array}{ccc|c} 1 & 0 & 0 & 1 & 2 \\ 0 & -1 & 0 & 0 & -2 \\ 0 & 0 & 1 & 0 & 0 \\ 0 & 0 & 0 & 1 & -\frac{1}{3} \end{array}$$

$$\begin{array}{l}
 R_1 - 2R_3 \Rightarrow \begin{array}{ccc|c} 1 & -3 & 0 & 0 & 3 \\ 0 & -1 & 0 & 0 & 3/5 \\ 0 & 0 & 1 & 0 & 0 \\ 0 & 0 & 0 & 1 & -1/5 \end{array} \\
 \\
 \Rightarrow \begin{array}{ccc|c} 1 & 0 & 0 & 0 & 6/5 \\ 0 & 1 & 0 & 0 & -3/5 \\ 0 & 0 & 1 & 0 & 0 \\ 0 & 0 & 0 & 1 & -1/5 // \end{array} \\
 \\
 \begin{array}{l} x = 6/5 \\ y = -3/5 \end{array} \quad \begin{array}{l} z = 0 \\ w = -1/5 \end{array}
 \end{array}$$

Šis ir tas, ko Wolfram saka, kur mani rezultāti sakrīt ar Wolfram doto.

FROM THE MAKERS OF WOLFRAM LANGUAGE AND MATHEMATICA

WolframAlpha

$x-3y+2z+5w=2; 2x-7y+2z+8w=5; 3x+2y+2z+2w=2; 4x+5y+2z-w=2$

NATURAL LANGUAGE **MATH INPUT** **EXTENDED KEYBOARD** **EXAMPLES** **UPLOAD** **RANDOM**

Input

$\{x-3y+2z+5w=2, 2x-7y+2z+8w=5, 3x+2y+2z+2w=2, 4x+5y+2z-w=2\}$

Solution Decimal form ☒ Step-by-step solution

$w = -\frac{1}{5}, x = \frac{6}{5}, y = -\frac{3}{5}, z = 0$

Alternate forms

$\{5w+x+2z=3y+2, 2(4w+x+z)=7y+5, 2w+3x+2(y+z)=2, w+2=4x+5y+2z\}$

$\left\{z = -\frac{5w}{2} - \frac{x}{2} + \frac{3y}{2} + 1, z = -4w - x + \frac{7y}{2} + \frac{5}{2}, z = -w - \frac{3x}{2} - y + 1, z = \frac{w}{2} - 2x - \frac{5y}{2} + 1\right\}$

Enlarge **Data** **Customize** **Plain Text**

Pildot 3. uzdevumu, gribēju pārbaudīt, ko chatGPT izveidos. Tāpēc arī pie viņa vērsos.



You

Write a system of incompatible linear 3×3 equations in which no two coefficients are equal.



ChatGPT

Certainly, here's a system of incompatible linear 3×3 equations where no two coefficients are equal:

1. $2x + 3y - z = 7$
2. $4x - 5y + 2z = 12$
3. $6x + y + 4z = -5$

In this system, each equation contains distinct coefficients for each variable, ensuring no two coefficients are equal.



Iznāca šāds rezultāts. Uzreiz sapratu, ka ChatGPT nevar izveidot nesavienojamu sistēmu, taču tāpat paprasīju lai Wolframs izrēķina sistēmu.

FROM THE MAKERS OF WOLFRAM LANGUAGE AND MATHEMATICA



$2x+3y-z=7; 4x-5y+2z=12; 6x+y+4z=-5$



NATURAL LANGUAGE

MATH INPUT

EXTENDED KEYBOARD

EXAMPLES

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Input

$\{2x + 3y - z = 7, 4x - 5y + 2z = 12, 6x + y + 4z = -5\}$

Solution

Decimal form

☒ Step-by-step solution

$x = \frac{7}{2}, y = -2, z = -6$

Alternate forms

$\{2x + 3y = z + 7, 2(2x + z - 6) = 5y, 6x + y + 4z + 5 = 0\}$

$\{z = 2x + 3y - 7, z = -2x + \frac{5y}{2} + 6, z = -\frac{3x}{2} - \frac{y}{4} - \frac{5}{4}\}$

Enlarge

Data

Customize

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