3-MA’RUZA

CHIZIQLI ALGEBRAIK TENGLAMALAR SISTEMASI. KRAMER VA GAUSS USULLARI

REJA

1. **CHIZIQLI TENGLAMALAR SISTEMASINING UMUMIY KO'RINISHI**
2. **KRAMER METODI**
3. **GAUSS USULI**

n TA NOMA'LUMLI *n* TA TENGLAMALARDAN IBORAT CHIZIQLI TENGLAMALAR SISTEMASINING UMUMIY KO'RINISHI

$$\begin{cases} a_{11}x_1 + a_{12}x_2 + \cdots + a_{1n}x_n = b_1 \\ a_{21}x_1 + a_{22}x_2 + \cdots + a_{2n}x_n = b_2 \\ \cdots\cdots\cdots\cdots\cdots\cdots\cdots\cdots\cdots\cdots\cdots\cdots\cdots\cdots\cdots \\ a_{n1}x_1 + a_{n2}x_2 + \cdots + a_{nn}x_n = b_n \end{cases}$$

CHIZIQLI TENGLAMALAR SISTEMASINI KRAMER METODI YORDAMIDA YECHISH

CHIZIQLI TENGLAMALAR SISTEMASINING BOSH DETERMINANTI

$$\Delta = \begin{vmatrix} a_{11} & \dots & a_{n1} \\ \dots & \dots & \dots \\ a_{n1} & \dots & a_{nn} \end{vmatrix}$$

KRAMER METODI YORDAMIDA 3 NOMA'LUMLI TENGLAMALAR SISTEMASINI YECHISHGA DOIR MISOLLAR

$$\begin{cases} a_{11}x_1 + a_{12}x_2 + a_{13}x_3 = b_1 \\ a_{21}x_1 + a_{22}x_2 + a_{23}x_3 = b_2 \\ a_{31}x_1 + a_{32}x_2 + a_{33}x_3 = b_3 \end{cases}$$

KRAMER FORMULASINI QO'LLASH UCHUN ZARURIY SHART

$$\Delta = \begin{vmatrix} a_{11} & a_{12} & a_{13} \\ a_{21} & a_{22} & a_{23} \\ a_{31} & a_{32} & a_{33} \end{vmatrix} \neq 0$$

YORDAMCHI DETERMINANTLARNI HISOLASH

$$\Delta_1 = \begin{vmatrix} b_1 & a_{12} & a_{13} \\ b_2 & a_{22} & a_{23} \\ b_3 & a_{32} & a_{33} \end{vmatrix} \qquad \Delta_2 = \begin{vmatrix} a_{11} & b_1 & a_{13} \\ a_{21} & b_2 & a_{23} \\ a_{31} & b_3 & a_{33} \end{vmatrix}$$

$$\Delta_3 = \begin{vmatrix} a_{11} & a_{12} & b_1 \\ a_{21} & a_{22} & b_2 \\ a_{31} & a_{32} & b_3 \end{vmatrix}$$

TENGLAMALAR SISTEMASINI YECHISH UCHUN KRAMER FORMULASI

$$x_1 = \frac{\Delta_1}{\Delta}, \quad x_2 = \frac{\Delta_2}{\Delta}, \quad x_3 = \frac{\Delta_3}{\Delta}$$

KRAMER USULIDA TENGLAMALAR SISTEMASINI YECHISH

$$\begin{cases} x_1 - x_3 = 2, \\ 2x_1 - x_2 + 3x_3 = -1, \\ 3x_1 + 2x_2 - 2x_3 = 5. \end{cases}$$

ASOSIY VA YORDAMCHI DETERMINANTLARNI HISOBLASH

$$\Delta = \begin{vmatrix} 1 & 0 & -1 \\ 2 & -1 & 3 \\ 3 & 2 & -2 \end{vmatrix} = 2 + 0 - 4 - 3 - 6 - 0 = -11 \neq 0.$$

$$\Delta_1 = \begin{vmatrix} 2 & 0 & -1 \\ -1 & -1 & 3 \\ 5 & 2 & -2 \end{vmatrix} = 4 + 0 + 2 - 5 - 12 - 0 = -11,$$

DETERMINANTLARNI HISOBLASH

$$\Delta_2 = \begin{vmatrix} 1 & 2 & -1 \\ 2 & -1 & 3 \\ 3 & 5 & -2 \end{vmatrix} = 2 + 18 - 10 - 3 - 15 + 8 = 0,$$

$$\Delta_3 = \begin{vmatrix} 1 & 0 & 2 \\ 2 & -1 & -1 \\ 3 & 2 & 5 \end{vmatrix} = -5 + 0 + 8 + 6 + 2 - 0 = 11.$$

YECHIM

$$x_1 = \frac{\Delta_1}{\Delta} = \frac{-11}{-11} = 1,$$

$$x_2 = \frac{\Delta_2}{\Delta} = \frac{0}{-11} = 0,$$

$$x_3 = \frac{\Delta_3}{\Delta} = \frac{11}{-11} = -1.$$

GAUSS USULIDA TENGLAMALAR SISTEMASINI YECHISH

$$\begin{cases} x_1 - x_3 = 2, \\ 2x_1 - x_2 + 3x_3 = -1, \\ 3x_1 + 2x_2 - 2x_3 = 5. \end{cases}$$

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

$$\sim \left(\begin{array}{ccc|c} 1 & 0 & -1 & 2 \\ 0 & 1 & -5 & 5 \\ 0 & 0 & 11 & -11 \end{array}\right) \sim \begin{cases} x_1 - x_3 = 2, \\ x_2 - 5x_3 = 5, \\ 11x_3 = -11. \end{cases}$$

$$11x_3 = -11 \implies x_3 = \frac{-11}{11} \implies x_3 = -1.$$

$$x_2 - 5 \cdot (-1) = 5 \implies x_2 + 5 = 5 \implies x_2 = 0.$$

$$x_1 - x_3 = 2 \implies x_1 - (-1) = 2 \implies x_1 = 1.$$

Demak, sistemaning yechimi $\{1;\ 0;\ -1\}$.

Foydalanilgan adabiyotlar

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