TOSHKENT IRRIGATSIYA VA QISHLOQ XO'JALIGINI MEXANIZATSIYALASH MUHANDISLARI INSTITUTI

MAVZU:
TESKARI MATRITSANI TOPISH

R E J A:

1. Matritsani transponirlash

2. Teskari matritsani topish

Matritsaning barcha satr elementlarini ustun elementlari bilan mos ravishda almashtirish amaliga matritsani ***tronsponirlash*** deyiladi.

$$A = \begin{pmatrix} a_{11} & a_{12} & a_{13} \\ a_{21} & a_{22} & a_{23} \\ a_{31} & a_{32} & a_{33} \end{pmatrix}$$

$$A^T = \begin{pmatrix} a_{11} & a_{21} & a_{31} \\ a_{12} & a_{22} & a_{32} \\ a_{13} & a_{23} & a_{33} \end{pmatrix}$$

Berilgan matritsani transponirlang.

$$A = \begin{pmatrix} 5 & 8 & -4 \\ 6 & 9 & -5 \\ 4 & 7 & -3 \end{pmatrix}$$

$$A^T = \begin{pmatrix} 5 & 6 & 4 \\ 8 & 9 & 7 \\ -4 & -5 & -3 \end{pmatrix}$$

Teskari matritsani topish

$$A = \begin{pmatrix} a_{11} & a_{12} & a_{13} \\ a_{21} & a_{22} & a_{23} \\ a_{31} & a_{32} & a_{33} \end{pmatrix}$$

$$A^{-1} = \frac{1}{|A|} \begin{pmatrix} A_{11} & A_{21} & A_{31} \\ A_{12} & A_{22} & A_{32} \\ A_{13} & A_{23} & A_{33} \end{pmatrix}$$

$$A \cdot A^{-1} = E$$

Teskari matritsani toping

1. $A = \begin{pmatrix} 1 & 2 \\ 3 & 4 \end{pmatrix}$, $A^{-1} = ?$

Yechish. $|A| = \begin{vmatrix} 1 & 2 \\ 3 & 4 \end{vmatrix} = 4 - 6 = -2,$

$A_{11} = (-1)^2 \cdot 4 = 4,\ A_{12} = (-1)^3 \cdot 3 = -3,$

$A_{21} = (-1)^3 \cdot 2 = -2,\ A_{22} = (-1)^4 \cdot 1 = 1$

$$A^{-1} = \frac{1}{|A|}\begin{pmatrix} A_{11} A_{21} \\ A_{12} A_{22} \end{pmatrix} = -\frac{1}{2}\begin{pmatrix} 4 & -2 \\ -3 & 1 \end{pmatrix} =$$

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

2. $A = \begin{pmatrix} 2 & 5 & 7 \\ 6 & 3 & 4 \\ 5 & -2 & -3 \end{pmatrix}, \quad A^{-1} = ?$

Yechish. $|A| = -18 + 100 - 84 - 105 + 90 + 16 = -1,$

$A_{11} = \begin{vmatrix} 3 & 4 \\ -2 & -3 \end{vmatrix} = -1, A_{12} = -\begin{vmatrix} 6 & 4 \\ 5 & -3 \end{vmatrix} = 38,$

$A_{13} = \begin{vmatrix} 6 & 3 \\ 5 & -2 \end{vmatrix} = -27,$

$$A_{21} = -\begin{vmatrix} 5 & 7 \\ -2 & -3 \end{vmatrix} = 1, A_{22} = \begin{vmatrix} 2 & 7 \\ 5 & -3 \end{vmatrix} = -41,$$

$$A_{23} = -\begin{vmatrix} 2 & 5 \\ 5 & -2 \end{vmatrix} = 29,$$

$$A_{31} = \begin{vmatrix} 5 & 7 \\ 3 & 4 \end{vmatrix} = -1, A_{32} = -\begin{vmatrix} 2 & 7 \\ 6 & 4 \end{vmatrix} = 34,$$

$$A_{33} = \begin{vmatrix} 2 & 5 \\ 6 & 3 \end{vmatrix} = -24$$

$$A^{-1} = -\begin{pmatrix} -1 & 1 & -1 \\ 38 & -41 & 34 \\ -27 & 29 & -24 \end{pmatrix}$$

$$= \begin{pmatrix} 1 & -1 & 1 \\ -38 & 41 & -34 \\ 27 & -29 & 24 \end{pmatrix}$$

TEKSHIRISH:

$$A \cdot A^{-1} = \begin{pmatrix} 2 & 5 & 7 \\ 6 & 3 & 4 \\ 5 & -2 & -3 \end{pmatrix} \cdot \begin{pmatrix} 1 & -1 & 1 \\ -38 & 41 & -34 \\ 27 & -29 & 24 \end{pmatrix} =$$

$$= \begin{pmatrix} 2-190+189 & -2+205-203 & 2-170+168 \\ 6-114+108 & -6+123-116 & 6-102+96 \\ 5+76-81 & -5-82+87 & 5+68-72 \end{pmatrix} =$$

$$= \begin{pmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{pmatrix}$$

Mustaqil yechish uchun misollar

Berilgan matritsalarga teskari matritsani toping.

$$A = \begin{pmatrix} 2 & 1 & -1 \\ 5 & 2 & 4 \\ 7 & 3 & 2 \end{pmatrix}, \quad B = \begin{pmatrix} 2 & -4 & 9 \\ 7 & 3 & -6 \\ 7 & 9 & -9 \end{pmatrix}.$$

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E’tiboringiz uchun rahmat!