



TOSHKENT IRRIGATSIYA VA QISHLOQ
XO'JALIGINI MEXANIZATSIYALASH
MUHANDISLARI INSTITUTI



MAVZU: TESKARI MATRITSANI TOPISH

REJA:

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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 matritsalariga 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!*