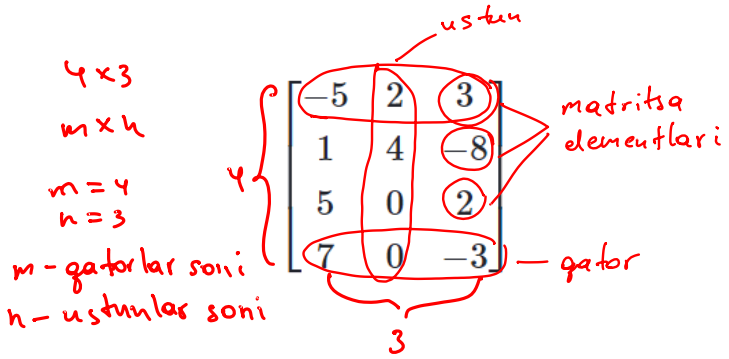
Chiziqli algebra asoslari

1. **Matritsa:** A



$$A=\begin{pmatrix}3 & 5\\ 6 & 2\\ 1 & -1\end{pmatrix}$$

$$B=\begin{Vmatrix}-1 & 3 & 4\\ 2 & 0 & 0\\ 1 & 5 & 9\end{Vmatrix}$$

2. **Kvadrat matritsa:** $m = n$

① $m=n=2$

$$A=\begin{pmatrix}2 & 0\\ 1 & -1\end{pmatrix}$$

2 x 2

2-tartibli matritsa

② $m=n=3$

$$B=\begin{pmatrix}3 & 0 & -1\\ -1 & 2 & 9\\ 7 & 8 & 6\end{pmatrix}$$

3 x 3

3-tartibli matritsa

③ $m=n=4$

$$C=\begin{pmatrix}5 & 6 & 7 & -5\\ 8 & 3 & 2 & 1\\ -1 & 0 & 0 & -6\end{pmatrix}$$

4 x 4

4-tartibli kvadrat matritsa

3. **Matritsalarning umumiy ko'rinishi:** a_{ij}

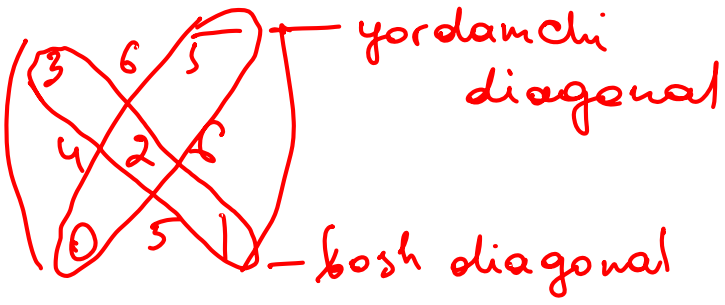
$$A=\begin{pmatrix}3 & 5\\ 6 & 2\end{pmatrix}$$

$$A=\begin{pmatrix}a_{11} & a_{12} & a_{13} & \dots & a_{1n}\\ a_{21} & a_{22} & a_{23} & \dots & a_{2n}\\ \vdots & & & & \\ a_{m1} & a_{m2} & a_{m3} & \dots & a_{mn}\end{pmatrix}=(a_{ij}) \quad \begin{matrix} i=1,\dots,m\\ j=1,\dots,n\end{matrix}$$

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

$$A=(a_{ij}) \quad i=\overline{1,m} \quad j=\overline{1,n}$$

4. **Bosh va yordamchi diagonal:** *faqatgina kvadrat matritsa uchun tegishli*



5. Nol matritsa: $O, a_{ij} = 0, o'lcham\ ahamiyatsiz$

$$O_1 = \begin{pmatrix} 0 & 0 & 0 \\ 0 & 0 & 0 \\ 0 & 0 & 0 \end{pmatrix} \quad O_2 = \begin{pmatrix} 0 \\ 0 \\ 0 \end{pmatrix} \quad O_3 = \begin{pmatrix} 0 & 0 & 0 \\ 0 & 0 & 0 \end{pmatrix}$$

6. Diagonal matritsa: Bosh diagonalda joylashmagan barcha elementlari nolga teng matritsa

$$\begin{pmatrix} 3 & 5 & 2 \\ 4 & 6 & 8 \\ -1 & 1 & 7 \end{pmatrix} \rightarrow \begin{pmatrix} 3 & 0 & 0 \\ 0 & 6 & 0 \\ 0 & 0 & 7 \end{pmatrix}$$

– bosh diagonal

7. Birlik matritsa: Barcha elementlari 1 ga teng bo'lgan diagonal matritsa, I yoki E

$$I = \begin{pmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{pmatrix} \quad E = \begin{pmatrix} 1 & 0 \\ 0 & 1 \end{pmatrix} \quad A = \begin{pmatrix} 1 & 0 & 0 & 0 \\ 0 & 1 & 0 & 0 \\ 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & 1 \end{pmatrix}$$

8. Satr matritsa yoki satr-vektor:

$m \times n$ $m=1$ yoki $n=1 \rightarrow$ vektor

$m=1$ bo'lganda vektor yoki satr vektor yoki satr matritsa

$$A = (5, 7, 0, -1) \quad 1 \times 4 \quad m=1,\ n=4$$

9. Ustun matritsa yoki ustun-vektor:

$n=1$ bo'lganda, vektor yoki ustun vektor yoki ustun matritsa

$$A=\begin{pmatrix}5\\0\\0\\6\end{pmatrix}_{4\times1} \qquad B=\begin{pmatrix}1\\7\\9\end{pmatrix}_{3\times1}$$

10. Matritsani songa ko'paytirish: $\lambda \bullet A$

$\lambda=3 \quad A=\begin{pmatrix}6&7\\8&1\end{pmatrix}$

$$\lambda\cdot A=\begin{pmatrix}6\cdot3&7\cdot3\\8\cdot3&1\cdot3\end{pmatrix}=\begin{pmatrix}18&21\\24&3\end{pmatrix}$$

11. Matritsalarni bir-biriga qo'shish: $A+B$, bir xil o'lchamli matritsalar uchun

$$A=\begin{pmatrix}6&7\\8&0\\-1&1\end{pmatrix} \quad 3\times2 \qquad B=\begin{pmatrix}1&1\\7&9\\8&5\end{pmatrix} \quad 3\times2$$

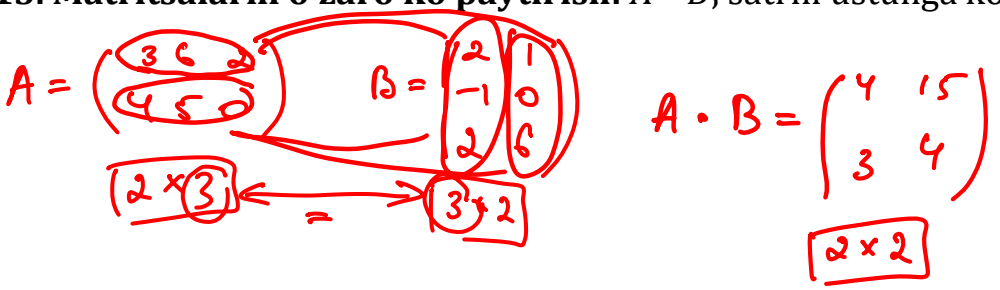
$$A+B=\begin{pmatrix}1+6&7+1\\8+7&0+9\\-1+8&1+5\end{pmatrix}=\begin{pmatrix}7&8\\15&9\\7&6\end{pmatrix} \quad 3\times2$$

12. Matritsalarning ayirmasi: $A-B$, bir xil o'lchamli matritsalar uchun

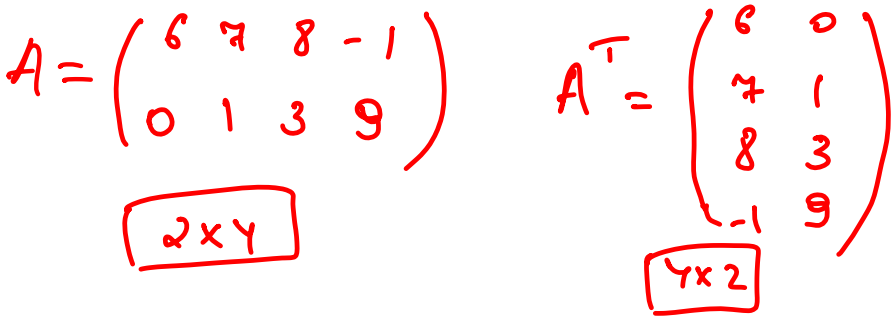
$$A=\begin{pmatrix}7&8&6&5\\-1&1&0&1\end{pmatrix} \quad 2\times4 \qquad B=\begin{pmatrix}1&0&0&9\\2&0&2&4\end{pmatrix} \quad 2\times4$$

$$A-B=\begin{pmatrix}7-1&8-0&6-0&5-9\\-1-2&1-0&0-2&1-4\end{pmatrix}=\begin{pmatrix}6&8&6&-4\\-3&1&-2&-3\end{pmatrix} \quad 2\times4$$

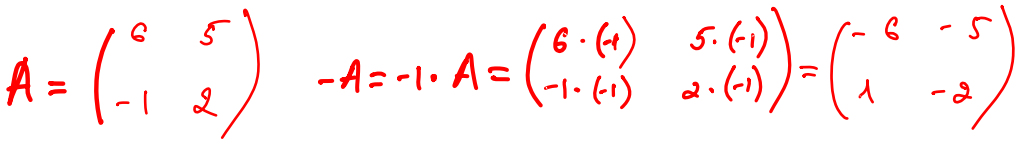
13. Matritsalarni o'zaro ko'paytirish: $A \bullet B$, satrni ustunga ko'paytirish qoidasi



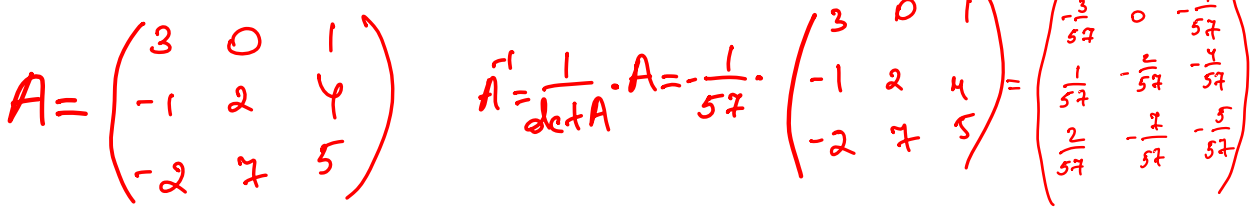
14. Matritsani transponirlash: A^T, satrlarni ustunlar bilan almashtirish

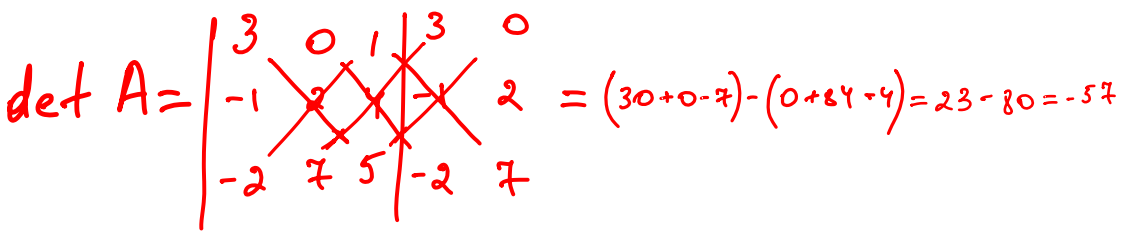


15. Matritsaga qarama-qarshi matritsa: $-A$



16. Matritsaga teskari matritsa: $A \bullet A^{-1} = I$





17. Determinantni hisoblash: $detA, faqatgina\ kvadrat\ matritsa\ uchun$

$$A = \begin{pmatrix} 3 & 0 & 5 \\ 1 & -1 & 2 \\ 4 & 0 & -3 \end{pmatrix}$$

$$\det A = \begin{vmatrix} 3 & 0 & 5 \\ 1 & -1 & 2 \\ 4 & 0 & -3 \end{vmatrix} \begin{matrix} 3 & 0 \\ & -1 \\ & 0 \end{matrix} = \underbrace{(9+0+0)}_{9} - \underbrace{(0+0+(-20))}_{-20} =$$

$$= 9 - (-20) = 29$$

$$\boxed{\det A = 29}$$