WOLFRAM MATHEMATICA DASTURIDA MATRITSALAR USTIDA AMALAR HAMDA ULAR USTIDA HISOBLASHLARNI BAJARISH

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Annotatsiya. Ushbu maqolada Wolfram Mathematica murakkab hisoblashlarni bajarishni o‘rganishdan iborat. Maqola Wolfram Mathematica amaliy tatbiqlari bilan qiziquvchilar uchun juda foydali deb o‘ylayman.

Kalit so‘zlar: Wolfram Mathematica , Shift, Enter, Matritsa;

Quyidagilarni kiritaylik:

```
In[1]:= In {1} = {{-1, 2, 3, 1}, {-2, 6, 0, 1}, {-1, 7, 4, -2}}
```

(1)

yuqoridagi ifodada Wolfram Mathematica dasturida matritsani kiritish usulidir. Bunda qavs ichidagi birinchi to‘rtta had 4x4 matri birinch satr elementlaridir. Bu ifodani kiritib **Shift va Enter** tugmasini birdaniga bosib quyidagini hosil qilamiz:

```
Out[1]= {{-1, 2, 3, 1}, {-2, 6, 0, 1}, {-1, 7, 4, -2}}
```

(2)

(2)-ifodani odaty matritsa ko‘rinishga o‘tkazish uchun MatrxForm buyrug‘dan foydalanamiz:

$$\text{In}\{2\} = \textbf{MatrixForm}[\{\{-1,2,3,1\},\{-2,6,0,1\},\{-1,7,4,-2\}\}]$$

Enter tugmasini bosib quyidagini olamiz:

```
Out[ ]//MatrixForm=
```

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

Navbatda olingan matritsani tranponirlashni o‘rganaylik, ya’ni matritsa ustun va satr elementlarini o‘rinlarini almashtirish qanday amalga oshirish mumkinligini ko‘raylik. Bunda **Transpose**[*matritsa o‘rni*] dan foydalaniladi.

$$\textbf{MatrixForm}[\textbf{Transpose}[\{\{-2,4,6,2\},\{-4,12,0,2\},\{-2,14,8,-4\}\}]]$$

(3)

Shift va Enter tugmasini birdaniga bosib quyidagini hosil qilamiz

```
Out[ ]//MatrixForm=
```

$$\begin{pmatrix} -2 & -4 & -2 \\ 4 & 12 & 14 \\ 6 & 0 & 8 \\ 2 & 2 & -4 \end{pmatrix}$$

Navbatda quyidagi A matrtsaga teskari matritsa hosil qilaylik, bunda **De**t[*matitsa o‘rni*] dan foydalanamiz.

$$A = \text{MatrixForm}[\{\{1,2,2,3\},\{4,2,5,7\},\{3,2,8,5\},\{2,8,7,3\}\}] \quad (4)$$

Buning uchun ishchi sohaga **Det[A]** ni kiritamiz:

In[8]:= Det[⎛1 2 2 3⎞]
        |детерминант ⎜4 2 5 7⎟
                     ⎜3 2 8 5⎟
                     ⎝2 8 7 3⎠

Shift va Enter tugmasini birdaniga bosib quyidagini hosil qilamiz:

Out[8]= 148

Bundan ko'rinadiki 4x4 matritsani determinant noldan farqli ekan. Bu matritsaga teskari matritsani

In[11]:= Inverse[⎛1 2 2 3⎞]
         |обратная матрица ⎜4 2 5 7⎟
                          ⎜3 2 8 5⎟
                          ⎝2 8 7 3⎠

$$A = \left\{\left\{-\frac{101}{74}, \frac{26}{37}, -\frac{23}{74}, \frac{9}{37}\right\}, \left\{\frac{1}{37}, \frac{3}{74}, -\frac{6}{37}, \frac{11}{74}\right\}, \left\{\frac{3}{74}, -\frac{7}{37}, \frac{19}{74}, -\frac{1}{37}\right\}, \left\{\frac{55}{74}, -\frac{5}{37}, \frac{3}{74}, -\frac{6}{37}\right\}\right\}$$

ko'rinishga keladi //**MatrixForm** buyrug'i bilan quyidagi ko'rinishga keladi:

Out[9]//MatrixForm=

$$\begin{pmatrix} -\frac{101}{74} & \frac{26}{37} & -\frac{23}{74} & \frac{9}{37} \\ \frac{1}{37} & \frac{3}{74} & -\frac{6}{37} & \frac{11}{74} \\ \frac{3}{74} & -\frac{7}{37} & \frac{19}{74} & -\frac{1}{37} \\ \frac{55}{74} & -\frac{5}{37} & \frac{3}{74} & -\frac{6}{37} \end{pmatrix}$$

Navbatda keying funksiya bilan tanishaylik ya'ni matritsani darajaga ko'tarish masalasi. Bunda

$$A = \begin{pmatrix} 1 & 2 & 2 & 3 \\ 4 & 2 & 5 & 7 \\ 3 & 2 & 8 & 5 \\ 2 & 8 & 7 & 3 \end{pmatrix}$$

Matritsa berilgan bo'lsin, misol uchun kvadratga ko'taraylik. Buning uchun **MatrixPower[A,2] //MatrixForm** kabi yoziladi, bunda

Out[10]//MatrixForm=

$$\text{MatrixPower}\left[\begin{pmatrix} -\frac{101}{74} & \frac{26}{37} & -\frac{23}{74} & \frac{9}{37} \\ \frac{1}{37} & \frac{3}{74} & -\frac{6}{37} & \frac{11}{74} \\ \frac{3}{74} & -\frac{7}{37} & \frac{19}{74} & -\frac{1}{37} \\ \frac{55}{74} & -\frac{5}{37} & \frac{3}{74} & -\frac{6}{37} \end{pmatrix}, 2\right]$$

In[12]:= $\left\{\left\{\frac{5613}{2738}, -\frac{2477}{2738}, \frac{329}{1369}, -\frac{354}{1369}\right\}, \left\{\frac{373}{5476}, \frac{171}{5476}, -\frac{277}{5476}, -\frac{39}{5476}\right\}, \left\{-\frac{96}{1369}, -\frac{33}{1369}, \frac{227}{2738}, -\frac{57}{2738}\right\}, \left\{-\frac{3113}{2738}, \frac{727}{1369}, -\frac{281}{1369}, \frac{509}{2738}\right\}\right\}$

Out[12]//MatrixForm=

$$\begin{pmatrix} \frac{5613}{2738} & -\frac{2477}{2738} & \frac{329}{1369} & -\frac{354}{1369} \\ \frac{373}{5476} & \frac{171}{5476} & -\frac{277}{5476} & -\frac{39}{5476} \\ -\frac{96}{1369} & -\frac{33}{1369} & \frac{227}{2738} & -\frac{57}{2738} \\ -\frac{3113}{2738} & \frac{727}{1369} & -\frac{281}{1369} & \frac{509}{2738} \end{pmatrix}$$

Shu tariq boshq funksiyalari bilan ham tanishib chiqish mumkin.

Xulosa

Xulosa o‘rnida zamonaviy ta’linda hisoblashlarni osonlashtirish uchun turli dasturlardan foydalaniladi. Bunda Wolfram Matematika dasturi ham o‘niga ega. Murakkab hisoblashlarni amalga oshirishda ushbu dastur muxim ahamiyatga egadir.

FOYDALANILGAN ADABIYOTLAR

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