33-mavzu:
Darsda yechiladigan misollar

1.Yangi koordinatalar sistemasining koordinatalar boshi O' va koordinata $\vec{e}'_1, \vec{e}'_2, \vec{e}'_3$ vektorlarining koordinatalari berilgan. Almashtirish formulalarini yozing.

$$а)\ \vec{e}_1'(1,0,0),\quad \vec{e}_2'(2,4,0),\quad \vec{e}_3'\left(-3,1,\frac{1}{2}\right),\quad O'(0,0,0)$$
$$б)\ \vec{e}_1'(-1,1,0),\quad \vec{e}_2'(2,-1,0),\quad \vec{e}_3'(0,0,5),\quad O'(5,0,2)$$
$$в)\ \vec{e}_1'(-1,0,0),\quad \vec{e}_2'(0,1,0),\quad \vec{e}_3'(0,0,-1),\quad O'(1,1,2)$$

2. $ABCDA_1B_1C_1D_1$ kubning tasviri berilgan. O kub diagonallarining kesishgan nuqtasi. Agar $A, \vec{e}_1\vec{e}_2\vec{e}_3$-eski koordinatalar sistemasi, $O, \vec{e}_1'\vec{e}_2'\vec{e}_3'$-yangi koordinatalar sistemasi bo'lsa, koordinatalarni almashtirish formulasini yozing. Bu erda $\overrightarrow{A_1B_1} = \vec{e}_1$, $\overrightarrow{A_1D_1} = \vec{e}_2$, $\overrightarrow{A_1A} = \vec{e}_3$, $\overrightarrow{OA_1} = \vec{e}_1'$, $\overrightarrow{OB_1} = \vec{e}_2'$, $\overrightarrow{OC} = \vec{e}_3'$.

3. $OABC$ tetraedr tasviri berilgan. $O, \vec{e}_1 = \overrightarrow{OA}, \vec{e}_2 = \overrightarrow{OB}, \vec{e}_3 = \overrightarrow{OC}$ affin koordinatalar sistemasidan $O' = A$, $\vec{e}_1' = \overrightarrow{AO}$, $\vec{e}_2' = \overrightarrow{AB}$, $\vec{e}_3' = \overrightarrow{AC}$ affin koordinatalarga o'tish formulasini yozing.

4. Agar almashtirishlar formulalari quyidagicha berilgan bo'lsa, yangi koordinata vektorlarining va yangi koordinata sistemasining koordinata boshining koordinatalarini, eski koordinatalar sistemasiga nisbatan toping.

$$\begin{array}{lll} а)\ x = x' - 3y' + z', & б)\ x' = x + 1, & в)\ x' = -x + 1, \\ \quad y = x' + y', & \quad y' = y - 3, & \quad y = -x' - y' + 2z' + 2, \\ \quad z = x' + 1. & \quad z' = z. & \quad z = z' - 3. \end{array}$$

5. Quyidagi:

$$\begin{aligned} x &= x' + 2y' + z' - 1, \\ y &= 2x' - y' + z', \\ z &= 3x' + y' + 2z' + 1. \end{aligned}$$

formula koordinatalarni almashtirish formulasi bo'ladimi? Tushuntiring.

6. Ushbu matritsalarning qaysi biri ortogonal?

$$\text{a)} \begin{pmatrix} 1 & 0 & 0 \\ 0 & \cos\varphi & \sin\varphi \\ 0 & -\sin\varphi & \cos\varphi \end{pmatrix}, \text{ b)} \begin{pmatrix} 1 & 2 & 4 \\ 0 & 0 & -1 \\ 0 & \frac{1}{2} & 3 \end{pmatrix}, \text{ v)} \begin{pmatrix} 0 & \frac{1}{\sqrt{2}} & \frac{1}{\sqrt{2}} \\ \frac{1}{\sqrt{2}} & \frac{1}{2} & -\frac{1}{2} \\ \frac{1}{\sqrt{2}} & -\frac{1}{2} & \frac{1}{2} \end{pmatrix},$$

$$g)\begin{pmatrix} \frac{1}{2} & 0 & \frac{\sqrt{3}}{2} \\ 0 & 1 & 0 \\ \frac{\sqrt{3}}{2} & 0 & -\frac{1}{2} \end{pmatrix}, \ d)\begin{pmatrix} \frac{\sqrt{2}}{2} & -\frac{\sqrt{2}}{2} & 0 \\ -\frac{\sqrt{2}}{2} & \frac{\sqrt{2}}{2} & \frac{1}{2} \\ 0 & 0 & \frac{1}{2} \end{pmatrix}$$