

Mavzu: Fazodadagi to'g'ri chiziq va ularning turli ko'rinishdagi tenglamalari. Tekislik va to'g'ri chiziq haqidagi aralash masalalar

R e j a :

- 1.To'g'ri chiziqning kanonik va parametrik tenglamasi**
- 2.Fazoda tekislik va to'g'ri chiziqlarga oid masalalar**

1.To'g'ri chiziqning kanonik va parametrik tenglamasi

To'g'ri chiziqning kanonik tenglamasi

$$\frac{x - x_0}{l} = \frac{y - y_0}{m} = \frac{z - z_0}{n}$$

Agar

$$\frac{x - x_0}{l} = \frac{y - y_0}{m} = \frac{z - z_0}{n} = t \quad (t \in R)$$

deb olsak

$$x = x_0 + lt, \quad y = y_0 + mt, \quad z = z_0 + nt$$

tenglamalar sistemasi hosil bo'ladi. Uni **to'g'ri chiziqning parametrik tenglamasi** deyiladi.

2. Fazoda tekislik va to'g'ri chiziqlarga oid masalalar

1. Nuqtadan tekislikgacha masofani topish.

Fazoda

$$Ax + By + Cz + D = 0$$

tenglama bilan berilgan T tekislik va bu tekislikda yotmagan $p(x_0, y_0, z_0)$ nuqtani qaraylik. P nuqtadan T tekislikka tushirilgan perpendikulyar uzunligi bu nuqtadan T tekislikgacha masofani bildiradi.

Bu masofa quyidagi formula bilan topiladi.

$$p = \frac{|Ax_0 + By_0 + Cz_0 + D|}{\sqrt{A^2 + B^2 + C^2}}$$

2. *Uch nuqtadan o'tuvchi tekislik tenglamasi.*

$$P_1(x_1 \ y_1 \ z_1) \ P_2(x_2 \ y_2 \ z_2) \ P_3(x_3 \ y_3 \ z_3)$$

$$\begin{vmatrix} x - x_1 & y - y_1 & z - z_1 \\ x_2 - x_1 & y_2 - y_1 & z_2 - z_1 \\ x_3 - x_1 & y_3 - y_1 & z_3 - z_1 \end{vmatrix} = 0$$

3. *Fazoda ikki nuqtadan o'tuvchi to'g'ri chiziq tenglamasi.*

$$\frac{x - x_1}{x_2 - x_1} = \frac{y - y_1}{y_2 - y_1} = \frac{z - z_1}{z_2 - z_1}$$

4. *To'g'ri chiziq va tekislikning parallellik va perpendikulyarlik alomati.*

$$\frac{x - x_0}{l} = \frac{y - y_0}{m} = \frac{z - z_0}{n}$$

tenglamalar bilan aniqlangan to'g'ri chiziq hamda

$Ax + By + Cz + D = 0$ tekislik berilgan bo'lsin. Bu to'g'ri chiziq va tekislikning o'zaro parallel

bo'lishi uchun $Al + Bm + Cn = 0$ tenglik bajarilishi zarur.

Ularning perpendikulyar bo'lishi uchun esa

$$\frac{A}{l} = \frac{B}{m} = \frac{C}{n}$$

5. Fazoda ikki to'g'ri chiziqning parallellik va perpendikulyarlik shartlari.

Bizga $\frac{x - x_1}{l_1} = \frac{y - y_1}{m_1} = \frac{z - z_1}{n_1} \quad \frac{x - x_2}{l_2} = \frac{y - y_2}{m_2} = \frac{z - z_2}{n_2}$

tenglamalar bilan ifodalangan ikki to'g'ri chiziq berilgan bo'lsin.

Ikki komplanar to'g'ri chiziqlarning o'zaro parallellik sharti

Ikki komplanar to'g'ri chiziqlarning o'zaro parallellik sharti:

$$\frac{l_2}{l_1} = \frac{m_2}{m_1} = \frac{n_2}{n_1}$$

Perpendikulyarlik sharti:

$$l_1 l_2 + m_1 m_2 + n_1 n_2 = 0$$

6. Nuqtadan to'g'ri chiziqgacha bo'lgan masofani topish.

$P_1(x_1, y_1, z_1)$ nuqtadan $\frac{x-x_0}{l} = \frac{y-y_0}{m} = \frac{z-z_0}{n}$ to'g'ri chiziqgacha bo'lgan p masofa

$$p^2 = \frac{\left| \begin{array}{cc} x_1 - x_0 & y_1 - y_0 \\ l & m \end{array} \right|^2 + \left| \begin{array}{cc} y_1 - y_0 & z_1 - z_0 \\ m & n \end{array} \right|^2 + \left| \begin{array}{cc} z_1 - z_0 & x_1 - x_0 \\ n & l \end{array} \right|^2}{l^2 + m^2 + n^2}$$

7. $\frac{x - x_0}{l} = \frac{y - y_0}{m} = \frac{z - z_0}{n}$ to'g'ri chiziq bilan

$Ax + By + Cz + D = 0$ tekislik orasidagi burchak

$$\sin\varphi = \frac{|Al + Bm + Cn|}{\sqrt{A^2 + B^2 + C^2}\sqrt{l^2 + m^2 + n^2}}$$