

## 17. Кръстосани прости

Разстоянието между две кръстосани прости е доказвано да е същото

1 Дадени са кръстосани прости

да се намери дистанцията а на

и б и разстоянието

между а и б

① Нека  $a \angle g = M$  и  $a \angle h = N$

$$= \begin{cases} M(-1-2M_0, -2-3M_0, 10+7M_0) \\ N(-1+2N_0, 11-10, 5+10) \end{cases}$$

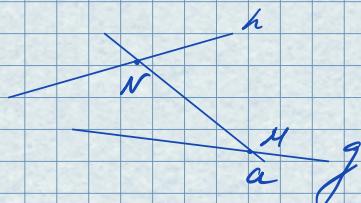
$$\rightarrow \vec{MN}(2N_0+2M_0, 13-10+3M_0, -5+10-7M_0)$$

$$\vec{p}(1, -1, 1) \parallel g \text{ и } \vec{q}(-2, -3, 7) \parallel h$$

$$\begin{cases} x = -4-2M \\ y = -2-3M \\ z = 10+7M \end{cases}$$

$$\begin{cases} x = -1+2N \\ y = 11-10 \\ z = 5+10 \end{cases}$$

$$\begin{cases} x = -1+2N \\ y = 11-10 \\ z = 5+10 \end{cases}$$



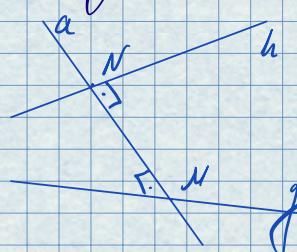
$$\textcircled{2} \text{ али } g, h \Rightarrow \vec{MN} \perp g, h$$

$$\Rightarrow \vec{MN} \perp \vec{p}, \vec{q} \Rightarrow \vec{p} \cdot \vec{MN} = 0 \text{ и} \\ \vec{q} \cdot \vec{MN} = 0$$

[...]

2 Да се намери разстоянието между кръстосани прости.

$$g: \begin{cases} 2x + 7y - 13 = 0 \\ 3y - 2z - 1 = 0 \end{cases}$$



$$h: \begin{cases} x = 3-1 \\ y = 1 \\ z = 16-1 \end{cases}$$

① Нека а е от линия g и h. Нека  $a \angle g = M$  и  $a \angle h = N$ . Намериме  $t = 1'$

$$2x + 7y - 13 = 0$$

$$3y - 2z - 1 = 0$$

$$\Rightarrow y = \frac{2z + 1}{3}$$

$$2x + 14z + 7 - 13 = 0$$

$$\frac{16}{3} - \frac{14z}{3} = \frac{7}{3}$$

$$② \begin{cases} x = \frac{16}{3} - \frac{7z}{3} \\ y = \frac{1}{3} + \frac{2z}{3} \end{cases}$$

$$g: \begin{cases} y = \frac{1}{3} + \frac{2z}{3} \\ z = 1' \end{cases}, 1' + 1 \text{ е паралелна}$$

$$\vec{MN}\left(\frac{8}{3} - \frac{7z}{3} - 10, -1 - \frac{2z}{3} + 10, 16 - 1 - 10\right)$$

$$③ M \in g:$$

$$\rightarrow M\left(\frac{16}{3} - \frac{7z}{3}, \frac{1}{3} + \frac{2z}{3}, 1\right)$$

Не h:

$$\Rightarrow N(8-10, 10, 16-10)$$

$$④ \vec{p}\left(-\frac{7}{3}, \frac{2}{3}, 1\right) \parallel g \Rightarrow \vec{g} \parallel (-21, 6, 9) \parallel \vec{p} \parallel g$$

$$\vec{q}(-1, 1, -1) \parallel h \Rightarrow \vec{q} \parallel \vec{g} \parallel h \parallel g$$

$$⑤ \quad \overrightarrow{gp}, \overrightarrow{3g} \perp \overrightarrow{MN}: \quad \langle \overrightarrow{gp}, \overrightarrow{MN} \rangle = 0$$

$$\langle \overrightarrow{3g}, \overrightarrow{MN} \rangle = 0$$

$$-21\left(\frac{8}{3} + \frac{7}{3}s - 10\right) + 6\left(-\frac{1}{3} + \frac{2}{3}s + 10\right) + 9(16 - s - 10) = 0$$

$$-3\left(\frac{8}{3} - \frac{7}{3}s - 10\right) + 3\left(-\frac{1}{3} + \frac{2}{3}s + 10\right) - 3(16 - s - 10) = 0$$

$$-56 - 49s + 21s - 1 + 4s + 6s + 144 - 9s - 9s = 0$$

$$-8 + 7s - 3s - 1 + 2s + 8s - 48 + 3s + 3s = 0$$

$$9s - 81s + 43 = 0$$

$$0.10 + 31s - 43 - 6s - 57 = 0$$

$$25s = 100, \quad s = 4$$

$$9s - 6s - 57 = 0$$

$$9s - 6s - 57 = 0$$

$$10 = 9$$

$$\Rightarrow M(-4, 3, 4) \cup N(-1, 9, 7) \Rightarrow \overline{MN}(3, 6, 5)$$