$P_1(x_1, y_1)$, $P_2(x_2, y_2)$, $\overline{P_1P_2}\,(x_2 - x_1, y_2 - y_1)$

$\bar a\,(a_1, a_2)$, $|\bar a| = \sqrt{a_1^2 + a_2^2}$

$\bar a \cdot \bar b = |\bar a| \cdot |\bar b| \cdot \cos(\widehat{\bar a, \bar b})$

$$\boxed{\bar a \perp \bar b \Rightarrow \bar a \cdot \bar b = 0}$$

$M_0^* \in d_1 \Rightarrow y - y_{M_0} = m_{d_1}(x - x_{M_0})$

$y = mx + n$

$y_0 = m_{d_1} x_0 + n$

$$\left.\begin{array}{l}\bar a\,(a_1, a_2, a_3)\\ \bar b\,(b_1, b_2, b_3)\end{array}\right\} \Rightarrow \bar a \cdot \bar b = a_1 b_1 + a_2 b_2 + a_3 b_3$$

$$pr_{\vec b}\,\vec u = \frac{\vec u \cdot \bar b}{|\bar b|^2} \cdot \bar b$$

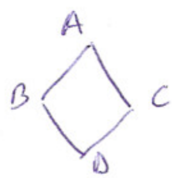
$$\left.\begin{array}{l}d: ax + by + c = 0\\ P\,(x_0, y_0)\end{array}\right\} \Rightarrow d(P, d) = \frac{a x_0 + b y_0 + c}{\sqrt{a^2 + b^2}}$$

$$\bar a \times \bar b = \begin{vmatrix} \bar i & \bar j & \bar k \\ a_1 & a_2 & a_3 \\ b_1 & b_2 & b_3 \end{vmatrix} = \bar i \begin{vmatrix} a_2 & a_3 \\ b_2 & b_3 \end{vmatrix} + \bar j \begin{vmatrix} a_1 & a_3 \\ b_1 & b_3 \end{vmatrix} + \bar k \begin{vmatrix} a_1 & a_2 \\ b_1 & b_2 \end{vmatrix}$$

$|\vec u \times \vec v| = |\bar u| \cdot |\bar v| \cdot \sin(\widehat{\bar u, \bar v})$

$\vec u \times \vec v = 0 \Rightarrow \vec u \parallel \vec v$

$S_{ABCD} = |\overline{AB} \times \overline{AC}|$



$$\frac{AM}{MB} = k$$

$$M\left(\frac{x_A + k \cdot x_B}{1 + k}, \frac{y_A + k \cdot y_B}{1 + k}\right)$$

$$S_{ABCDA'B'C'D'} = |(\overline{AB}, \overline{AD}, \overline{AA'})| = \begin{vmatrix} a_1 & a_2 & a_3 \\ b_1 & b_2 & b_3 \\ c_1 & c_2 & c_3 \end{vmatrix}$$

$y = mx + n$
↓ slope

$d \parallel d_1 \Rightarrow m_d = m_{d_1}$

$d \perp d_1 \Rightarrow m_d \cdot m_{d_1} = -1$.

*

angle between d and d_1

$$tg\,\varphi = \frac{m_d - m_{d_1}}{1 + m_d \cdot m_{d_1}}$$

Param eq of the line

$$d: \begin{cases} x = x_P + ut \\ y = y_P + st \end{cases}, t \in \mathbb{R}$$

$P(x_P, y_P)$

$\bar v\,(u, s)$

$\Leftarrow$ $P(x_1, y_1)$, $P_2(x_2, y_2)$

$$\frac{x - x_1}{x_2 - x_1} = \frac{y - y_1}{y_2 - y_1} = t$$

$d_{\lambda,\mu}: \lambda(x-x_0)+\mu(y-y_0)=0$

The eq. of the bundle of vertex $P_0(x_0,y_0)$

$P(x_0,y_0,z_0)$, $\overline{v_1}(p_1,q_1,r_1)$, $\overline{v_2}(p_2,q_2,r_2)$

$$\pi: \begin{vmatrix} x-x_0 & y-y_0 & z-z_0 \\ p_1 & q_1 & r_1 \\ p_2 & q_2 & r_2 \end{vmatrix} = 0$$

$ax+by+cz+d=0$ - general eq. of a plane

- normal vector of the plane is $\overline{n_\pi}(a,b,c)$

$$d: \frac{x-x_0}{p}=\frac{y-y_0}{q}=\frac{z-z_0}{r} \Rightarrow \overline{v}(p,q,r) \parallel d$$

sym. eq.

$P(x_0,y_0,z_0)$

$\overline{v}(p,q,r) \to$ director vector of d

$\pi_1, \overline{n_1}$, π_2, $\overline{n_2}$

$$m(\widehat{\overline{n_1},\overline{n_2}}) = \begin{cases} m(\widehat{\overline{n_1},\overline{n_2}}), \text{ if } \overline{n_1}\,\overline{n_2} \geq 1 \\ \pi - m(\overline{n_1},\overline{n_2}) \text{ if } \overline{n_1}\,\overline{n_2} < 0 \end{cases}$$