

8) 

$(1, 0, 1) + t(2, -1, 0) + s(-5, 0, 1)$	$x + 2y + 3z = 0$	$\parallel$	$I$	$20/\sqrt{30}$	$3\sqrt{70}/5$
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$$m_1 = \begin{vmatrix} l_1 & l_2 & l_3 \\ 2 & -1 & 0 \\ -5 & 0 & 1 \end{vmatrix} = (-1, -2, -5) \quad \begin{aligned} x + 2y + 5z + d &= 0 \Rightarrow 1 + 5 + d = 0 \quad d = -6 \\ x + 2y + 5z - 6 &= 0 \quad \cos \theta = \frac{1 + 5 + 15}{\sqrt{11} \cdot \sqrt{30}} = \frac{20}{\sqrt{11} \cdot \sqrt{30}} \end{aligned}$$

$$\begin{cases} x + 2y + 5z - 6 = 0 \\ x + 2y + 3z = 0 \end{cases} \Rightarrow \begin{cases} 2z = 6 \quad z = 3 \\ x = -2y - 3 \end{cases} \quad r: (-2\delta - 3, \delta, 3)$$

$$|OP|^2 = (-2\delta - 3)^2 + \delta^2 + 9 \sim -5(-2\delta - 3) + 2\delta = 0 \Rightarrow 10\delta = -16 \quad \delta = -\frac{16}{5}$$

$$P = \left( \frac{36}{5} - \frac{55}{5}, -\frac{16}{5}, 3 \right) = \left( -\frac{9}{5}, -\frac{16}{5}, 3 \right) \quad \sqrt{\frac{81 + 256 + 225}{25}} = \sqrt{\frac{620}{25}} = \frac{2\sqrt{155}}{5}$$

9) 

$(1, 0, 1) + t(2, -1, 0) + s(-5, 1, 0)$	$x + 2y + 3z = 0$	$\parallel$	$I$	$3/\sqrt{15}$	$\sqrt{70}/5$
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$$m_1 = \begin{vmatrix} l_1 & l_2 & l_3 \\ 2 & -1 & 0 \\ -5 & 1 & 0 \end{vmatrix} = (0, 0, -3) \quad \begin{aligned} z + d &= 0 \quad d = -1 \quad z - 1 = 0 \\ \cos \theta &= \frac{3}{\sqrt{15}} \end{aligned}$$

$$r: \begin{cases} x = -2y - 3 \\ z = 1 \end{cases} \Rightarrow (-2\delta - 3, \delta, 1)$$

$$d^2 = (-2\delta - 3)^2 + \delta^2 + 1 \sim -5(-2\delta - 3) + 2\delta = 0 \Rightarrow 10\delta = -12 \quad \delta = -\frac{6}{5}$$

$$P = \left( +\frac{12}{5} - 3, -\frac{6}{5}, 1 \right) = \left( -\frac{3}{5}, -\frac{6}{5}, 1 \right) \quad \sqrt{\frac{9}{25} + \frac{36}{25} + \frac{25}{25}} = \sqrt{\frac{70}{5}} = \sqrt{14}$$