



$$l_1: \begin{cases} x = 1 + t \\ y = 2 - t \\ z = 0 + 2t \end{cases}, \quad P: (1, -1, 1)$$

Godtyckelig punkt på l_1 : Välj $Q: (1, 2, 0)$

$$u = \overline{QP} = (0, -3, 1)$$

Projicera $u = \overline{QP}$ på linjens riktning $v = (1, -1, 2)$

$$u' = \frac{(0, -3, 1) \cdot (1, -1, 2)}{6} \cdot (1, -1, 2) = \frac{5}{6} (1, -1, 2)$$

$$u'' = -u' + u = -\frac{5}{6}(1, -1, 2) + (0, -3, 1) = \frac{1}{6}(-5, -13, -4)$$

Avstånd punkt - linje blir $|u''|$ så

$$\begin{aligned} A = |u''| &= \frac{1}{6} \sqrt{(-5)^2 + (-13)^2 + (-4)^2} = \\ &= \frac{1}{6} \sqrt{210} = \frac{\sqrt{35} \cdot \sqrt{6}}{6} = \sqrt{\frac{35}{6}} \end{aligned}$$

b) Parametrisera linjen

$$l: \begin{cases} x = 2t + 1 \\ y = 2t \\ z = t \end{cases}, \quad Q: (1, 0, 0) \\ P: (1, 0, 1)$$

$$u = \overline{QP} = (0, 0, 1)$$

$$u' = \frac{(0, 0, 1) \cdot (2, 2, 1)}{9} \cdot (2, 2, 1) = \frac{1}{9} (2, 2, 1)$$

$$u'' = -u' + u = -\frac{1}{9} (2, 2, 1) + (0, 0, 1) = \frac{1}{9} (-2, -2, 8) \\ = \frac{2}{9} (-1, -1, 4)$$

$$A = |u''| = \frac{2}{9} \sqrt{18} = \frac{2 \cdot \sqrt{2} \cdot \sqrt{9}}{9} = \frac{2\sqrt{2}}{3} = \frac{\sqrt{8}}{3}$$