

Line and Plane in Space

Ex 1.

Check if the line given parametrically

$$\ell : x = 1 + 2t, y = -1 + t, z = 3 - t$$

intersects the plane $\pi : 2x - y + z - 4 = 0$. If so, provide the intersection point.

Ex 2.

★ Calculate the distance of point $G(2, -1, 0)$ from the line passing through points $H(0, 0, 0)$ and $I(1, 1, 1)$.

Ex 3.

★ Consider the system of a line and a plane dependent on parameter λ :

$$\ell(\lambda) : x = \lambda + t, y = 1 + 2t, z = 2 - t$$

and

$$\pi : x - (\lambda - 1)y + z - 3 = 0$$

Determine the values of λ for which the line is parallel to the plane, contained in the plane, or intersects it at a single point.