Scalar equation of a line

To find the scalar equation of a line, we'll use the formulas

$$x = x_0 + at$$

$$y = y_0 + bt$$

$$z = z_0 + ct$$

where $P_0(x_0, y_0, z_0)$ is a given point and $v = \langle a, b, c \rangle$ is the given vector. The vector may also be in the format $v = ai + bj + ck$.

Example

Find the scalar equation of the line.

$$P(2,3,1)$$

$$\langle 2, -1, 5 \rangle$$

Plugging the given point and the given vector into our formulas for x, y and z, we get

$$x = 2 + 2t$$

$$y = 3 - t$$

$$z = 1 + 5t$$

The scalar equation of the line is given by $x = 2 + 2t$, $y = 3 - t$ and $z = 1 + 5t$.