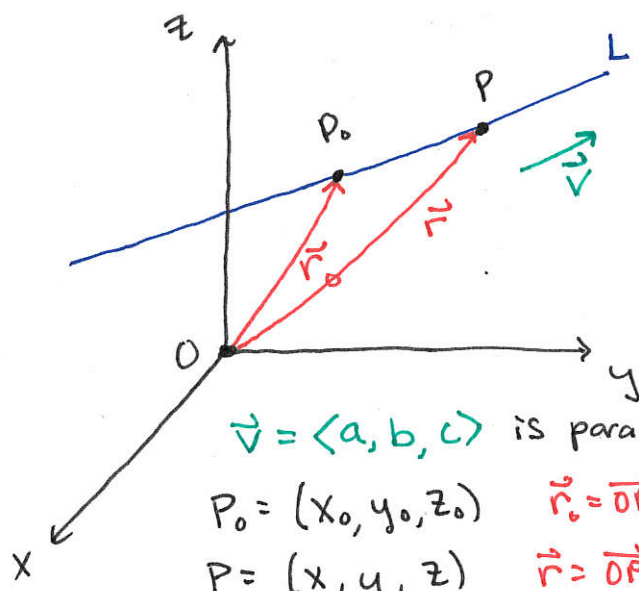
Lines in $\mathbb{R}^3$:

One point and a direction determine a line



Vector eqn: $\vec{r} = \vec{r}_0 + t\vec{v}$

Parametric eqns:

$x = x_0 + at, \quad y = y_0 + bt, \quad z = z_0 + ct$

Symmetric equations:

$$\frac{x - x_0}{a} = \frac{y - y_0}{b} = \frac{z - z_0}{c}$$

$\vec{v} = \langle a, b, c \rangle$ is parallel to L

$P_0 = (x_0, y_0, z_0)$ $\quad \vec{r}_0 = \overrightarrow{OP_0} = \langle x_0, y_0, z_0 \rangle$

$P = (x, y, z)$ $\quad \vec{r} = \overrightarrow{OP} = \langle x, y, z \rangle$

a, b, c are the "direction numbers" of L