Equations of Lines and Planes

Equations of Lines in $\mathbb{R}^2$

Normal Form	$\mathbf{n} \cdot \mathbf{x} = \mathbf{n} \cdot \mathbf{p}$ or $\mathbf{n} \cdot (\mathbf{x} - \mathbf{p}) = 0$
General Form	$ax + by = c$
Vector Form	$\mathbf{x} = \mathbf{p} + t\mathbf{d}$
Parametric Form	$\begin{cases} x = p_1 + td_1 \\ y = p_2 + td_2 \end{cases}$

Equations of Lines in $\mathbb{R}^3$

Normal Form	$\begin{cases} \mathbf{n}_1 \cdot \mathbf{x} = \mathbf{n}_1 \cdot \mathbf{p}_1 \\ \mathbf{n}_2 \cdot \mathbf{x} = \mathbf{n}_2 \cdot \mathbf{p}_2 \end{cases}$ or $\begin{cases} \mathbf{n}_1 \cdot (\mathbf{x} - \mathbf{p}_1) = 0 \\ \mathbf{n}_2 \cdot (\mathbf{x} - \mathbf{p}_2) = 0 \end{cases}$
General Form	$\begin{cases} a_1x + b_1y + c_1z = d_1 \\ a_2x + b_2y + c_2z = d_2 \end{cases}$
Vector Form	$\mathbf{x} = \mathbf{p} + t\mathbf{d}$
Parametric Form	$\begin{cases} x = p_1 + td_1 \\ y = p_2 + td_2 \\ z = p_3 + td_3 \end{cases}$

Equations of Planes in $\mathbb{R}^3$

Normal Form	$\mathbf{n} \cdot \mathbf{x} = \mathbf{n} \cdot \mathbf{p}$ or $\mathbf{n} \cdot (\mathbf{x} - \mathbf{p}) = 0$
General Form	$ax + by + cz = d$
Vector Form	$\mathbf{x} = \mathbf{p} + s\mathbf{u} + t\mathbf{v}$
Parametric Form	$\begin{cases} x = p_1 + su_1 + tv_1 \\ y = p_2 + su_2 + tv_2 \\ z = p_3 + su_3 + tv_3 \end{cases}$