eCornell

CHEAT SHEET

Linear Algebra

Add two vectors	$\mathbf{u} + \mathbf{v} = (u_1 + v_1, u_2 + v_2)$
Subtract two vectors	$\mathbf{u} - \mathbf{v} = (u_1 - v_1, u_2 - v_2)$
Multiply a vector by a constant	$c\mathbf{v} = (c\mathbf{v}_1, c\mathbf{v}_2)$
Calculate the norm	$\|\|\mathbf{v}\|\| = \sqrt{v_1^2 + v_2^2}$
Calculate the dot product	$\mathbf{x} \cdot \mathbf{y} = x_1 y_1 + x_2 y_2$
Dot product (geometric formula)	$\mathbf{x} \cdot \mathbf{y} = \|\|\mathbf{x}\|\| \cdot \|\|\mathbf{y}\|\| \cdot \cos\theta$
Defining a line with the dot product	$\mathbf{w} \cdot \mathbf{x} = b$
Distance between a point and a line (Case 1)	For a point P and line given by $\mathbf{w} \cdot \mathbf{x} = b$, the distance is $d = \dfrac{\mathbf{w} \cdot \mathbf{p}}{\|\|\mathbf{w}\|\|} - \dfrac{b}{\|\|\mathbf{w}\|\|}$.
Distance between a point and a line (Case 2)	If $b = 0$, the distance is simplified to $d = \dfrac{\mathbf{w} \cdot \mathbf{p}}{\|\|\mathbf{w}\|\|}$.