

## Basics

- dot product:  $\underline{a} \cdot \underline{b} = a_1b_1 + a_2b_2 + \dots = |\underline{a}||\underline{b}| \cos \theta$ ,  $W = \underline{F} \cdot \underline{d}$   
where F is force and d is distance
- Cross Product:  $\underline{v} \times \underline{w} = \begin{vmatrix} \hat{i} & -\hat{j} & \hat{k} \\ v_1 & v_2 & v_3 \\ w_1 & w_2 & w_3 \end{vmatrix}$
- The area of the quadrilateral which the vectors are enclosing is the determinant of the cross product
- Vector equation of line :  $(x, y, z) = (x_0, y_0, z_0) + t(a, b, c)$ ;  
where  $(a, b, c)$  is a vector parallel to the line and  $(x_0, y_0, z_0)$  is a point on the line
- Standard equation of line/plane:  $\underline{n} \cdot ((x, y, z) - (x_0, y_0, z_0)) = 0$ , where  $\underline{n}$  is a vector normal to the line/plane

## Parametrization