PDF 9.060 Distance From a Point to a Plane

Distance From a Point to a Plane: The distance from the point $P_o(x_o, y_o, z_o)$ to the plane with equation $Ax + By + Cz + D = 0$ is given by the formula

$$d = \frac{|Ax_o + By_o + Cz_0 + D|}{\sqrt{A^2 + B^2 + C^2}}$$

* This formula is justified in the powerpoint

Example 1

Determine the distance from the point S(-1,2,-4) to the plane with equation 8x – 4y + 8z + 3 = 0

Example 2

Determine the distance between the point (9,1,-2) and the plane $\vec{r} = \overrightarrow{(-2,1,-4)} + s\overrightarrow{(1,2,4)} + t\overrightarrow{(3,-2,-8)}$

Example 3

Determine the distance between the two planes $\pi_1: 2x - y + 2z + 4 = 0$ and $\pi_2: 2x - y + 2z + 16 = 0$

Example 4

Determine the shortest distance between the two skew lines

$L_1: \vec{r} = (0,2,4) + t(1,-2,1)$ and $L_2: \vec{r} = (-2,-5,4) + s(1,0,-1)$ (two possible methods)