

4.7.11

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Question:

Find the distance of the plane $2x - 3y + 4z - 6 = 0$ from the origin.

Solution:

The distance of a plane $Ax + By + Cz + D = 0$ from a point (x_0, y_0, z_0) is given by:

$$\text{Distance} = \frac{|Ax_0 + By_0 + Cz_0 + D|}{\sqrt{A^2 + B^2 + C^2}} \quad (1)$$

For the plane

$$2x - 3y + 4z - 6 = 0 \quad (2)$$

$$a = 2, b = -3, c = 4, d = -6$$

and the origin $(0, 0, 0)$, we have:

$$\text{Distance} = \frac{|2(0) - 3(0) + 4(0) - 6|}{\sqrt{2^2 + (-3)^2 + 4^2}} = \frac{|-6|}{\sqrt{4 + 9 + 16}} = \frac{6}{\sqrt{29}} \quad (3)$$

Thus, the distance of the plane from the origin is

$$\boxed{\frac{6}{\sqrt{29}}} \quad (4)$$

Graph presentation:

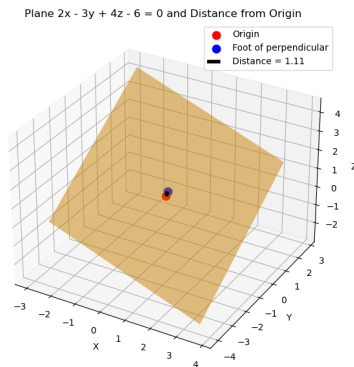


Fig. 1