

Parallel Lines

11th Maths - Chapter 10

This is Problem-6 from Exercise 10.3

1. Find the distance between parallel lines
 - (i) $15x+8y-34=0$ and $15x+8y+31=0$
 - (ii) $l(x+y)+p=0$ and $l(x+y)-r=0$

2. solution for problem 1

where

$$= (15 \ 8) \mathbf{x} = -34 \quad (1)$$

$$= (15 \ 8) \mathbf{x} = 31 \quad (2)$$

$$\mathbf{n} = \begin{pmatrix} 15 \\ 8 \end{pmatrix}, c_1 = -34, c_2 = 31 \quad (3)$$

distance between parallel lines

$$d = \frac{|c_1 - c_2|}{\|\mathbf{n}\|} \quad (4)$$

$$= \frac{|-34 - 31|}{\sqrt{289}} \quad (5)$$

$$= \frac{65}{17} \quad (6)$$

3. solution for problem 2

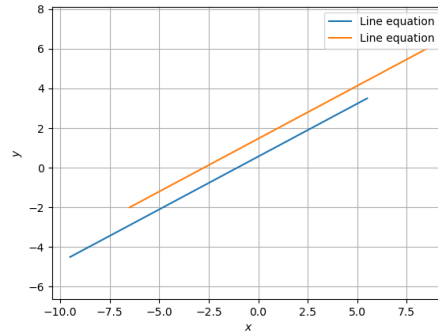


Figure 1

where

$$\mathbf{n} = \begin{pmatrix} 1 \\ 1 \end{pmatrix} \quad (7)$$

$$= (1 \ 1) \mathbf{x} = \frac{-p}{l} \quad (8)$$

$$= (1 \ 1) \mathbf{x} = \frac{-r}{l} \quad (9)$$

distance between parallel lines

$$d = \frac{1}{l\sqrt{2}}(p + r) \quad (10)$$

The distance between parallel lines is shown in figure 2 with normal vector as

$$= \mathbf{n} = \begin{pmatrix} 1 \\ 1 \end{pmatrix} \text{ and } c_1 = 1, c_2 = -1$$

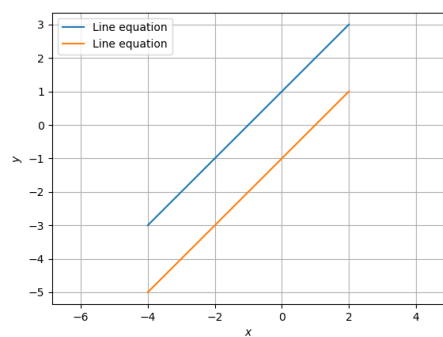


Figure 2