ASSIGNMENT 1

CS21BTECH11053

***Abstract*—From ICSE 2018 Class 12 Mathematics Examination**

Problem (19.b)**.** *Find the coeffecient of correlation from the regression lines*

$$x - 2y + 3 = 0 \tag{1}$$
$$4x - 5y + 1 = 0 \tag{2}$$

Solution:

We shall assume that (1) is the regression line of y on x and (2) is the regression line of x on y.

From (1)

$$y = \frac{x}{2} + \frac{3}{2} \tag{3}$$

From (2)

$$x = \frac{5y}{4} - \frac{1}{4} \tag{4}$$

From (3) and (4), we evaluate regression coefficents b_{yx} and b_{xy} as

$$b_{yx} = \frac{1}{2} \tag{5}$$
$$b_{xy} = \frac{5}{4} \tag{6}$$

Given b_{yx} and b_{xy}, we can find the coefficient of correlation r as

$$r = \pm\sqrt{b_{yx} \times b_{xy}} \tag{7}$$

Note that b_{yx}, b_{xy} and r have the same sign and $|r| \leq 1$.

From (5), (6), (7)

$$r = \pm\sqrt{\frac{1}{2} \times \frac{5}{4}} = \pm\sqrt{\frac{5}{8}} \tag{8}$$

Since $b_{yx} > 0$ and $b_{xy} > 0$, $r > 0$. Also note that $|r| \leq 1$. Hence our initial assumption was correct.

$$\therefore r = \sqrt{\frac{5}{8}} \tag{9}$$