EE5609: MATRIX THEORY
Assignment 1

Sneha Konduru
ee19acmtech11009

September 3, 2020

1 Question (Lines and Planes. Problem 39)

The line through the points $\begin{pmatrix} h \\ 3 \end{pmatrix}$ and $\begin{pmatrix} 4 \\ 1 \end{pmatrix}$ intersects the line $\begin{pmatrix} 7 & -9 \end{pmatrix}$ $\mathbf{X}$=19 at right angle. Find the value of h.

2 Solution

In the problem statement it is given that, line passing through the points $\begin{pmatrix} h \\ 1 \end{pmatrix}$ and $\begin{pmatrix} 4 \\ q \end{pmatrix}$. Slope of the line passing through the two points $\begin{pmatrix} x1 \\ y1 \end{pmatrix}$ and $\begin{pmatrix} x2 \\ y2 \end{pmatrix}$ calculated by using the fallowing formula

$$slope = \frac{y1 - y2}{x1 - x2} \tag{1}$$

By using equation 1, slope calculated is

$$m1 = \frac{2}{h - 4} \tag{2}$$

Slope of the straight line calculated by differentiating w.r.t x. Slope of the given straight line 7x-9y=19 is slope (m2)=$\frac{7}{9}$.
In the problem statement it is given that two straight lines are intersecting at right angles. When two straight lines are intersecting at right angles then their product of slopes is -1.

$$Productofslopes(m1 \times m2) = -1 \tag{3}$$

$$\frac{2}{h-4} \times \frac{7}{9} = -1 \tag{4}$$

$$h = \frac{22}{9} \tag{5}$$