Assignment-3

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Abstract—This document contains the procedure to evaluate the determinant

Download the python code from

https://github.com/ankuraditya13/EE5609−
Assignment3

and latex-file codes from

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1 PROBLEM

Evaluate the following determinant

$$\begin{vmatrix} a-b & b-c & c-a \\ b-c & c-a & a-b \\ c-a & a-b & b-c \end{vmatrix} = 0 \qquad (1.0.1)$$

2 SOLUTION

$$\text{Let, } |\mathbf{A}| = \begin{vmatrix} a-b & b-c & c-a \\ b-c & c-a & a-b \\ c-a & a-b & b-c \end{vmatrix} \qquad (2.0.1)$$

Applying row transformation in above determinant we get,

$$\begin{vmatrix} a-b & b-c & c-a \\ b-c & c-a & a-b \\ c-a & a-b & b-c \end{vmatrix} \xleftarrow{R_1 \leftarrow R_1 + R_2 + R_3} \qquad (2.0.2)$$

$$\begin{vmatrix} 0 & 0 & 0 \\ b-c & c-a & a-b \\ c-a & a-b & b-c \end{vmatrix} \qquad (2.0.3)$$

From equation (2.0.3) one of the row of $|\mathbf{A}|$ is zero

$$\implies |\mathbf{A}| = 0 \qquad (2.0.4)$$