$$|A| = \begin{vmatrix} 2 & 1 & 1 \\ 1 & -2 & -1 \\ 1 & 1 & 2 \end{vmatrix} = \begin{vmatrix} 2 & 0 & 1 \\ 1 & -1 & -1 \\ 1 & -1 & 2 \end{vmatrix} = 2(-2-1) - 1.0 = -6$$

Hence,

$$A^{-1} = \begin{bmatrix} 1/2 & 1/6 & -1/6 \\ 1/2 & -1/2 & -1/2 \\ -1/2 & 1/6 & 5/6 \end{bmatrix}$$

b) Since det B = 0, B is not invertible.

Example 3. Find the inverse of

$$A = \begin{bmatrix} a & b \\ c & d \end{bmatrix} \quad if\ |A| = ad - bc \neq 0$$

Example 3. Since

$$[A_{ij}] = \begin{bmatrix} d & -c \\ -b & a \end{bmatrix}$$

we have $A^{-1} = \begin{bmatrix} d & -b \\ -c & a \end{bmatrix} /[A] = \frac{\begin{bmatrix} d & -b \\ -c & a \end{bmatrix}}{ad-bc}$

3. Elementary row operations

Let A be rectangular matrix of shape mxn.Let the row matrices be $R_1, \ldots, R_m$ the following on rows are called the elementary row operations:

$R_i \Leftrightarrow R_j$: Interchanging of ith and jth rows,

$R_i + R_j$: Adding the jth row to the ith row,

$c\ R_i$: Multiplying a row by a non zero scalar.