Maths Notes November 17, 2024

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$$\begin{bmatrix} a & b \\ c & d \end{bmatrix} \cdot \begin{bmatrix} d & -b \\ -c & a \end{bmatrix} = \frac{1}{ad - bc} \quad \text{(Matrix multiplication and determinant)} \tag{1}$$

$$\forall M \in M_2(\mathbb{R}) \quad \text{(For all matrices in } M_2\text{)} \tag{2}$$

$$|M| \neq 0 \quad \text{(Condition for invertibility)} \tag{3}$$

$$\Rightarrow E_{M^{-1}} \in M_2(\mathbb{R}) \quad \text{(Inverse exists)} \tag{4}$$

$$M \cdot M^{-1} = m^{-1} \cdot I_2 \quad \text{(Multiplying by the inverse gives identity)} \tag{5}$$