Assignment 8
Due date: 28 May 2021
TA: 林宏懌 E817 (13:10~14:00)

1. Find the values of k for which the matrix A is invertible.

$$A = \begin{bmatrix} 1 & 2 & 0 \\ k & 1 & k \\ 0 & 2 & 1 \end{bmatrix}.$$

2. Prove that a square matrix A is invertible if and only if $A^\top A$ is invertible.

3. Prove that if A is a square matrix, then

$$\det(A^\top A) = \det(AA^\top).$$

4. Show that the matrix

$$A = \begin{bmatrix} \cos\theta & \sin\theta & 0 \\ -\sin\theta & \cos\theta & 0 \\ 0 & 0 & 1 \end{bmatrix}$$

is invertible for all values of θ. Then, find A^{-1}.