Practice Problems

MATH2055: Advanced Linear Algebra Tutorial 8
Matrix Products and the Exponential

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Prove that $\exp(A + B) = \exp(A)\exp(B)$ if A and B commute. Does the property still hold if A and B do not commute?

Define the following matrices:

$$A = \begin{bmatrix} 1 & 2 \\ 3 & 4 \\ 5 & 6 \end{bmatrix}, B = \begin{bmatrix} 7 & 8 \\ 9 & 10 \end{bmatrix}$$

Compute $A \otimes B$.

Question 3 - Schur Product Computation

Define the following matrices:

$$A = \begin{bmatrix} -1 & 3 & -5 & 1 & 3 \\ 1 & 4 & 0 & -2 & 0 \end{bmatrix}, B = \begin{bmatrix} 3 & -4 & 5 & 5 & 4 \\ -5 & -1 & 2 & -2 & -5 \end{bmatrix}$$

Compute $A \circ B$.

Prove or give a counterexample: The Schur product of symmetric matrices is symmetric.

Prove or give a counterexample: The Kronecker product is commutative.