

Matrices

4.12 Functional Matrices

If A is a $n \times n$ matrix then,

$$(a) \exp(A) = \sum_{j=0}^{\infty} \frac{A^j}{j!} = I + \frac{A}{1!} + \frac{A^2}{2!} + \frac{A^3}{3!} + \dots$$

$$(b) \sin(A) = \sum_{j=0}^{\infty} \frac{(-1)^j}{(2j+1)!} A^{2j+1} = A - \frac{A^3}{3!} + \frac{A^5}{5!} - \dots$$

$$(c) \cos(A) = \sum_{j=0}^{\infty} \frac{(-1)^j}{(2j)!} A^{2j} = I - \frac{A^2}{2!} + \frac{A^4}{4!} - \dots$$