

Linear Algebra

$$\begin{aligned} & \text{[> with(LinearAlgebra) :} \\ & \text{> } A := \text{Matrix}([[1, 5, 9, 7], [2, 3, 4, 0], [3, 4, 8, 0], [4, 3, 2, 1]]) \end{aligned}$$

$$A := \begin{bmatrix} 1 & 5 & 9 & 7 \\ 2 & 3 & 4 & 0 \\ 3 & 4 & 8 & 0 \\ 4 & 3 & 2 & 1 \end{bmatrix} \quad (1)$$

$$\begin{aligned} & \text{> } B := \text{MatrixInverse}(A) \end{aligned}$$

$$B := \begin{bmatrix} -\frac{8}{147} & -\frac{36}{49} & \frac{1}{3} & \frac{8}{21} \\ \frac{4}{147} & \frac{67}{49} & -\frac{2}{3} & -\frac{4}{21} \\ \frac{1}{147} & -\frac{20}{49} & \frac{1}{3} & -\frac{1}{21} \\ \frac{6}{49} & -\frac{17}{49} & 0 & \frac{1}{7} \end{bmatrix} \quad (2)$$

$$\begin{aligned} & \text{> } C := \text{Determinant}(A) \end{aligned}$$

$$C := -147 \quad (3)$$

Laplace

Problem 1:

$$\begin{aligned} & \text{[> with(inttrans) :} \\ & \text{> } \text{laplace}(\sin(a \cdot t), t, s) \end{aligned}$$

$$\frac{a}{a^2 + s^2} \quad (4)$$

$$\begin{aligned} & \text{> } \text{laplace}(\cos(5 \cdot t), t, s) \end{aligned}$$

$$\frac{s}{s^2 + 25} \quad (5)$$

$$\begin{aligned} & \text{> } \text{laplace}(\exp(a \cdot t), t, s) \end{aligned}$$

$$\frac{1}{s - a} \quad (6)$$

$$\left[\begin{array}{l} \text{> } \text{laplace}(t^3 \cdot \exp(3 \cdot t), t, s) \\ \frac{6}{(s-3)^4} \end{array} \right. \quad (7)$$

Problem 3:

$$\left[\begin{array}{l} \text{> } \text{laplace}(t \cdot \exp(-4 \cdot t) \cdot \sin(3 \cdot t), t, s) \\ \frac{6 (s+4)}{((s+4)^2 + 9)^2} \end{array} \right. \quad (8)$$