

MATH 4305 - Ordinary Differential Equations II
Homework 4 - Laplace Transform
Due - Wednesday, October 28, 2015

Determine the Laplace transform of the following functions using the definition of the Laplace transform which is

$$\mathcal{L}\{f(x)\} = F(s) = \int_0^{\infty} e^{-sx} f(x) dx$$

1. $f(x) = e^{4x}$
2. $f(x) = x^3$
3. $f(x) = \cos(3x)$
4. $f(x) = xe^{bx}$ where b is a constant.

Use the properties of Laplace transforms to determine the Laplace transform of the following functions:

5. $f(x) = x^3 e^{-2x}$
6. $f(x) = x^2 \sin(4x)$
7. $f(x) = e^{3x} \cos(5x)$
8. $f(x) = xe^{3x} \cos(x)$
9. $f(x) = \int_0^x t \sin(t) dt$
10. $f(x) = x^2 e^{3x} \sin(4x)$