

Translation of Laplace Transforms and Partial Fractions- HW Problems

In problems 1-3 find the Laplace transform of the given function.

1. $x(t) = t^2 e^{3t}$

2. $f(t) = e^{\left(\frac{t}{2}\right)} \cos(5t)$

3. $x(t) = e^{5t} \sin(2t)$

In problems 4-8 find the inverse Laplace Transform of the given function. Use partial fractions when appropriate.

4. $F(s) = \frac{1}{s^2+6s+9}$

5. $F(s) = \frac{s+3}{s^2+4s+8}$

6. $F(s) = \frac{6s^2-s-6}{s^3-s^2-6s}$

7. $F(s) = \frac{4}{s^3-4s}$

8. $F(s) = \frac{1}{s^4-2s^2+1}$

In problems 9-11 solve the initial value problems with Laplace transforms.

9. $x'' + 2x' + 6x = 6; \quad x(0) = x'(0) = 0$

10. $y'' + 4y' + 8y = e^{-t}; \quad y(0) = y'(0) = 0$

11. $y'' + 2y' + 2y = 2 \cos(t) + \sin(t); \quad y(0) = y'(0) = 0$