Tutorial Problem Set 2

1 Inverse Laplace Transform by Shifting Properties

EXERCISE 1.1. Using an appropriate shifting property, find the inverse of the following Laplace transforms $F(s)$:

(a) $\frac{s(1-e^{-2s})}{s^2+\pi^2}$

(b) $\frac{2s\left(e^{-\pi s}-e^{-2\pi s}\right)}{s^2+4}$

(c) $\frac{5-2s}{s^2+7s+10}$

(d) $\frac{3s+5}{s^2-6s+25}$

(e) $\frac{2s-3}{9s^2-12s+20}$

2 Inverse Laplace Transform by Partial Fractions

EXERCISE 2.1. Find the inverse of the following Laplace transforms $F(s)$, by partial fractions:

(a) $\frac{1}{s^4-16}$

(b) $\frac{s}{(s^2-1)^2}$

(c) $\frac{1}{(s+1)(s+2)(s^2+2s+2)}$

(d) $\frac{1}{(s+1)(s+2)(s^2+2s+2)}$

(e) $\frac{36}{s(s^2+1)(s^2+9)}$

3 Inverse of the Laplace Transform by Convolution Theorem

EXERCISE 3.1. Employing the convolution property, find the inverse of the following Laplace transforms $F(s)$:

(a) $\frac{1}{(s^2+1)s^2}$

(b) $\frac{s}{s^4+5s^2+4}$

(c) $\frac{s}{s^2+4s+5}$

(d) $\frac{1}{(s-3)(s^2+9)}$

(e) $\frac{1}{s^2(2s+1)}$