SARDAR VALLABHBHAI PATEL INSTITUTE OF TECHNOLOGY VASAD
B. E. Third Semester (2017-18)
Subject: Advanced Engineering Mathematics (2130002)

Tutorial -6

1 Calculate the following by integrating

1. $1 * 1$ 2. $t * \sin(t)$ 3. $u(t-1) * t^2$

2 Find the Laplace transform of the following:

1. $(t-1)^2 u(t-1)$ 2. $e^{-2t}H(t-3)$ 3.4 $u(t-\pi)\cos t$

3 Find Inverse Laplace transform of the following functions:

1. $\frac{2s^3}{s^4-81}$ 2. $\frac{a^2}{(s^2+a^2)^2}$ 3. $\frac{s^2}{(s^2+a^2)^2}$

4. $\frac{4(e^{-2s}-e^{-5s})}{s}$ 5. $\frac{e^{-2\pi s}}{s^2+2s+2}$ 6. $\frac{e^{-as}}{s(s-2)}$

4 Solve following Initial value problems using Laplace transform

1. $y''+y = 2\cos t, \quad y(0)=3, \quad y'(0)=4$
2. $y''-4y'+3y = 6t-8, \quad y(0)=0, \quad y'(0)=0$
3. $y''+2y'-3y = 6e^{-2t}, \quad y(0)=2, \quad y'(0)=-14$
4. $y''+y'-y = \delta(t-1), \quad y(0)=0, \quad y'(0)=0$
5. $y''+y = f(t),\ y(0)=0,\ y'(0)=0, where (1)\ f(t)=H(t-1), (2)\ f(t)=\begin{cases} t & 0<t\le 1 \\ 0 & t\ge 1 \end{cases}$

5 Find the Laplace transform of the periodic function which has period 2

$$f(t)=\begin{cases} t, & if \quad 0<t<1 \\ 2-t, & if \quad 1<t<2 \end{cases}$$

6 Find the Laplace transform of full-wave rectification of $|\sin wt|$

7 Solve the Voltra integral equation y(t) + $\int_0^t y(u)\cosh(t-u)\,du = t + e^t$