

SNS COLLEGE OF TECHNOLOGY



(An Autonomous Institution) Coimbatore – 35

DEPARTMENT OF MATHEMATICS

UNIT -V LAPLACE TRANSFORM

INVERSE LAPLACE TRANSFORM

Jen: If the Laplace Teansform of f(t) is F(s) (ii) LIF(t)] = F(s) Then ZIE) is called an inverse Laplace Transform of F(s) and is written as 2(+)= 1-1[FCS)] where 1-1 is called the inverse Laplace teansjormation operator.

Table of FLT: Transplate transplate transplate to

$$(2)$$
 1[1] = $\frac{1}{s^2}$

2)
$$L = \frac{1}{s^2}$$
 \Rightarrow $L^{-1} \begin{bmatrix} \frac{1}{s^2} \end{bmatrix} = t$

3)
$$L[tn] = \frac{n!}{s^{n+1}}$$

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$$L[tn] = \frac{n!}{s^{n+1}}$$
 \Rightarrow $L^{-1} \left[\frac{n!}{s^{n+1}}\right] = t^n$

4)
$$L[e^{at}] = \frac{1}{s-a}$$
 $\Rightarrow \sum_{i=1}^{s-a} L^{-i} \left[\frac{1}{s-a} \right] = e^{at}$

i)
$$L \left[e^{-at} J = 1\right] \Rightarrow 1^{-1} \left[\frac{1}{3+a}\right] = e^{-at}$$

6)
$$L[sinat] = \frac{\alpha}{s^2 + \alpha^2} \Rightarrow L^{-1} \left[\frac{\alpha}{s^2 + \alpha^2} \right] = sin \alpha t$$

7)
$$L \left[\frac{\sin \alpha t}{\alpha} \right] = \frac{1}{s^2 + a^2} \implies L^{-1} \left[\frac{1}{s^2 + a^2} \right] = \frac{\sin \alpha t}{a}$$



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8)
$$L \left[\cos \alpha t \right] = \frac{S}{S_{7}^{2} \alpha^{2}} \Rightarrow L^{-1} \left[\frac{3}{S_{7}^{2} \alpha^{2}} \right] = \cos \alpha t$$

9) $L \left[\sin h \alpha t \right] = \frac{\alpha}{S_{7}^{2} \alpha^{2}} \Rightarrow L^{-1} \left[\frac{\alpha}{S_{7}^{2} \alpha^{2}} \right] = \sinh h \alpha t$

10) $L \left[\cos h \alpha t \right] = \frac{S}{S_{7}^{2} \alpha^{2}} \Rightarrow L^{-1} \left[\frac{3}{S_{7}^{2} \alpha^{2}} \right] = \cosh \alpha t$

11) $L \left[\delta(t) \right] = 1 \Rightarrow L^{-1} \left[1 \right] = \delta(t)$

9) L[sin hat] =
$$\frac{a}{s^2 a^2}$$
 \Rightarrow $L^{-1} \left[\frac{a}{s^2 a^2} \right] = sin hat$

10) L [coshat] =
$$\frac{s}{s^2 a^2}$$
 \Rightarrow $1^{-1} \left[\frac{s}{s^2 a^2} \right] = Coshat$