

### 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 TLT: Transplate transplate transplate to

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

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

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

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

4) 
$$L[e^{at}J = \frac{1}{s-a}] \Rightarrow e^{at} = e^{at}$$

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

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

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



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8) 
$$L \left[ \cos \operatorname{at} \right] = \frac{S}{S^{2} + a^{2}} \Rightarrow L^{-1} \left[ \frac{3}{S^{2} + a^{2}} \right] = \cos \operatorname{at}$$

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

10)  $L \left[ \cos \operatorname{hat} \right] = \frac{S}{S^{2} - a^{2}} \Rightarrow L^{-1} \left[ \frac{3}{S^{2} - a^{2}} \right] = \cosh \operatorname{at}$ 

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