

SNS COLLEGE OF TECHNOLOGY



(An Autonomous Institution) Coimbatore – 35

DEPARTMENT OF MATHEMATICS

UNIT -V LAPLACE TRANSFORM

CONVOLUTION :

Defn. If fit) and g(t) are two functions defined for $t \ge 0$ then the convolution of g(t) & g(t) is defined as $g(t) * g(t) = (f * g)(t) = \int_{0}^{t} g(u)g(t-u) du$ Note: g(t) * g(t) = g(t) * f(t)Convolution Theorem: If f(t) & g(t) are two taplace transformable functions defined for $t\ge 0$ then L ff(t) * g(t) f & g(ven by) L ff(t) * g(t) = L ff(t) f * L [g(t) f $L^{-1} [F(s) \cdot G(s) f = L^{-1} [F(t) f * L^{-1} [G(t) f]$



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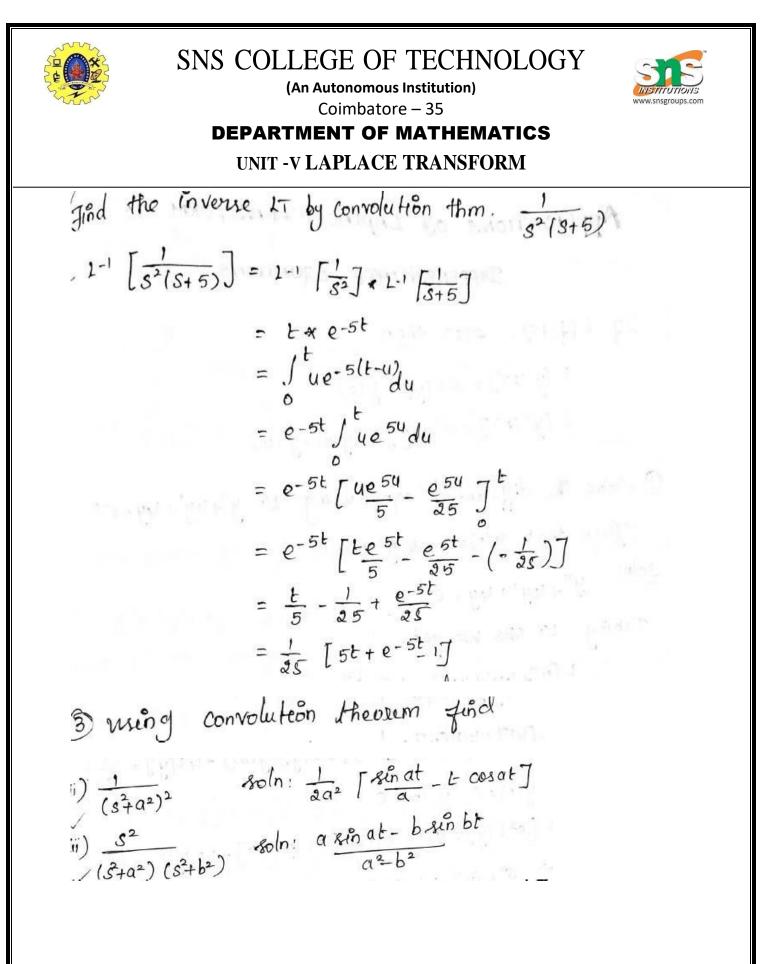
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UNIT -V LAPLACE TRANSFORM

() cusing convolution theorem find 1-1 [3+a2)2] $\frac{Soln:}{L^{-1} \left[\left(\frac{S}{S^2 + a^2} \right)^2 \right]} = L^{-1} \left[\frac{S}{S^2 + a^2}, \frac{1}{S^2 + a^2} \right]$ $= L^{-1} \left[\frac{S}{S^2 + a^2}, \frac{1}{S^2 + a^2} \right] \frac{[By]}{L^{-1} \left[\frac{1}{S^2 + a^2} \right]} \frac{[By]}{L^{-1} \left[\frac{1}{S^2 + a^2} \right]}$ = cos at sin at $= \frac{1}{a} \cos \frac{1}{a}$ $= \frac{1}{a} \cos \frac{1}{a} \sin \frac{1}{a}$ $= \frac{1}{a} \cos \frac{1}{a} \sin \frac{1}{a}$ = 1 trinat .



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