

SNS COLLEGE OF TECHNOLOGY (AN AUTONOMOUS INSTITUTION) COIMBATORE - 35



 $\label{eq:unitality} \begin{array}{l} \text{UNIT 5 } \mathbf{Z} \text{ - } \text{Transforms and Difference equations} \\ \text{Initial and Final value Theorem} \end{array}$

Initial Value Theorem!
If
$$z[f(t)] = F(z)$$
, then $f(o) = \lim_{Z \to 0} F(z)$
Final Value Theorem!
If $z[f(t)] = F(z)$, then $\lim_{L \to 0} F(t) = \lim_{Z \to 1} (z-1)F(z)$
Rubblams.on $IVT & FVT$
1. If $F'(z) = \frac{5Z}{(z-2)(z-3)}$, find $f(o)$ and $\lim_{L \to 0} H(t)$
Evo
Evo
 $f(o) = \lim_{Z \to 0} F(z) = \lim_{Z \to 0} \frac{5Z}{(z-2)(z-3)} = \lim_{Z \to 0} \frac{5Z}{z^{2}-52+6}$
 $= \lim_{Z \to 0} \frac{5}{2z-5}$ [By L Highthalis Rule]
 $= 0$.

By FVT, $\lim_{z \to 0} f(z) = \lim_{z \to 1} (z-1) F(z) = \lim_{z \to 1} (z-1) \frac{5z}{(z-2)(z-3)} = 0.$

23MAT201- PARTIAL DIFFERENTIAL EQUATIONS & TRANSFORMS DEPT OF MATHEMATICS 1 1



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 $\label{eq:UNIT 5 Z - Transforms and Difference equations} Initial and Final value Theorem$

d. Find the Initial & Final Value $q_F(z) = \frac{Z}{2z^2 - 3z^{+1}}$	
By IVT, lim F(z)= f(o) z>00	
$f(0) = \lim_{z \to \infty} \frac{z}{az^2 - 3z + 1} = \lim_{z \to \infty} \frac{1}{4z - 3}$	
= D .	
By FVT, $\lim_{t\to\infty} f(t) = \lim_{z\to 1} (z-1) F(z)$	
$= \lim_{z \to 1} (z-1) \frac{z}{2z-3z+1} uulou lister!$	
= line (z-1) Zz-DLZ-Delev baring	
(it is brue (at line $\frac{z}{az-1}$ is stri malinelited; $= \frac{1}{a(0)-1} = \frac{z}{1} = \frac{z}{1}$	