

GATE 2021-EE-31

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GATE 21 EE 31:

The causal signal with z-transform $\frac{z^2}{(z-a)^2}$ is

Solution:

Given z transform of the signal is $\frac{z^2}{(z-a)^2} = \left(\frac{1}{1-az^{-1}}\right)^2$

Let the signal be $x(n)$

$$x(n) = \mathcal{Z}^{-1} \left(\frac{1}{1-az^{-1}} \right)^2 \quad (1)$$

$$\left(\frac{1}{1-az^{-1}} \right)^2 \xleftrightarrow{Z} (n+1)a^n u(n) \quad |z| > |a| \quad (2)$$

$$x(n) = (n+1)a^n u(n) \quad (3)$$