Gate 2021 Assignment

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I. Question IN 02

Let $u(t)$ denote the unit step function . The bilateral laplace transform function $f(t) = e^t u(-t)$ is

A $\frac{1}{s-1}$ with real part of $s > 1$
B $\frac{-1}{s-1}$ with real part of $s > 1$
C $\frac{1}{s-1}$ with real part of $s < 1$
D $\frac{-1}{s-1}$ with real part of $s < 1$

II. Solution

Here we need bilateral laplace transform of $e^t u(-t)$
Laplace transform of $e^{-t}u(t)$ is :

$$= \frac{1}{s+1} \quad \sigma > -1 \tag{1}$$

Time reversal property:

$$e^t u(t) \rightarrow \frac{1}{-s+1} \quad \sigma < 1 \tag{2}$$

$$e^t u(-t) \leftrightarrow \frac{-1}{s-1} \quad Re(s) < 1 \tag{3}$$