

# GATE 2022 IN 61

EE23BTECH11007 - Aneesh Kadiyala\*

**Question:** Consider the function

$$f(z) = \frac{1}{(z+1)(z+2)(z+3)}$$

The residue of  $f(z)$  at  $z = -1$ , is \_\_\_\_\_  
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**Solution:**

Residue of a function  $f(z)$  at a simple pole  $c$  is

$$\text{Res}(f, c) = \lim_{z \rightarrow c} (z - c) f(z) \quad (1)$$

$$\implies \text{Res}(f, -1) = \lim_{z \rightarrow -1} \frac{z+1}{(z+1)(z+2)(z+3)} \quad (2)$$

$$= \frac{1}{2} \quad (3)$$

$\therefore$  residue of  $f(z)$  at  $z = -1$  is  $\frac{1}{2}$ .