

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 _____

Solution:

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

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

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

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

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