

GATE 2022 BM 61

EE23BTECH11007 - Aneesh K*

Question

Consider the function

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

The residue of $f(z)$ at $z = -1$, is _____ (GATE 2022 IN)

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 $\frac{1}{2}$.