NCERT DISCRETE

EE23BTECH11020 - Raghava Ganji*

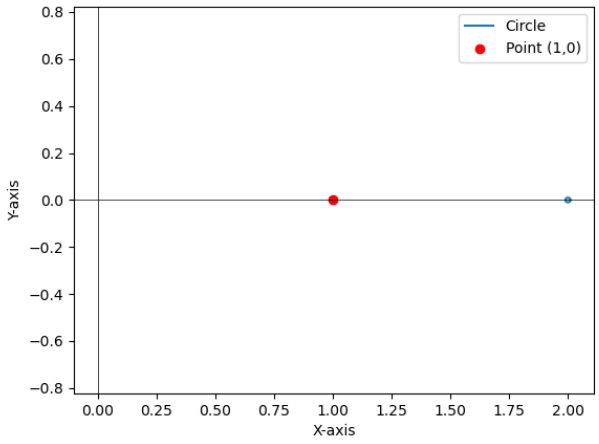

Fig. 0. graph of option A

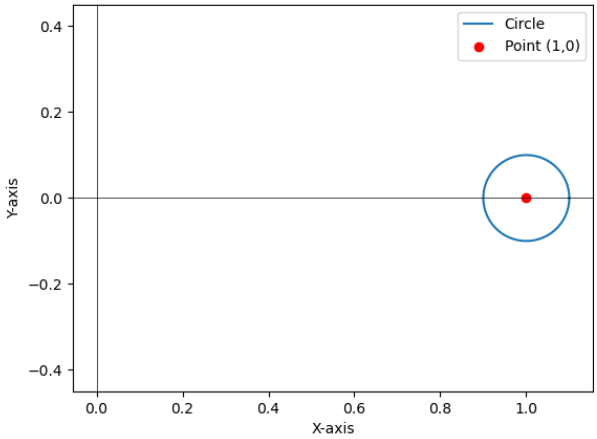

Fig. 0. graph of option B

GATE 2023 BM.48: The function $f(z) = \frac{1}{z-1}$ of a complex variable Z on a closed counter in an anti-clockwise direction.For which of the following counters, does this integral have a non-zero value?
$(A)|z-2| = 0.01$
$(B)|z-1| = 0.1$
$(C)|z-3| = 5$
$(D)|z| = 2$

Solution:

For the integral to have a non-zero value, the contour must enclose the singularity of the function.

For $\oint_c f(z)\,dz$ the singularity exists at $z = 1$.

Above given all the contours are circles. Therefore which contour encloses $z = 1$, then the given integral have a non-zero value.

After analysing all the graphs that we understand for options B,C,D contours encloses $z = 1$.

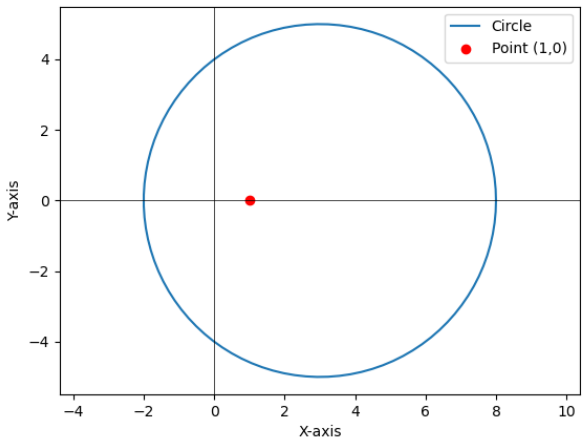

Fig. 0. graph of option C

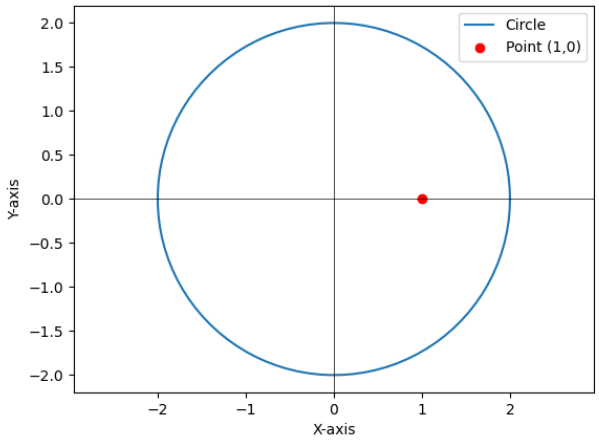

Fig. 0. graph of option D