

複素関数/フーリエ解析

1

以下の問いに答えよ.

- (i) 図1の曲線に沿った $\frac{\log z}{z^3+1}$ の複素積分を考えることにより,

$$\int_0^{\infty} \frac{1}{x^3+1} dx$$

を求めよ.

- (ii) 図1の曲線に沿った $\frac{(\log z)^2}{z^3+1}$ の複素積分を考えることにより,

$$\int_0^{\infty} \frac{\log x}{x^3+1} dx$$

を求めよ.

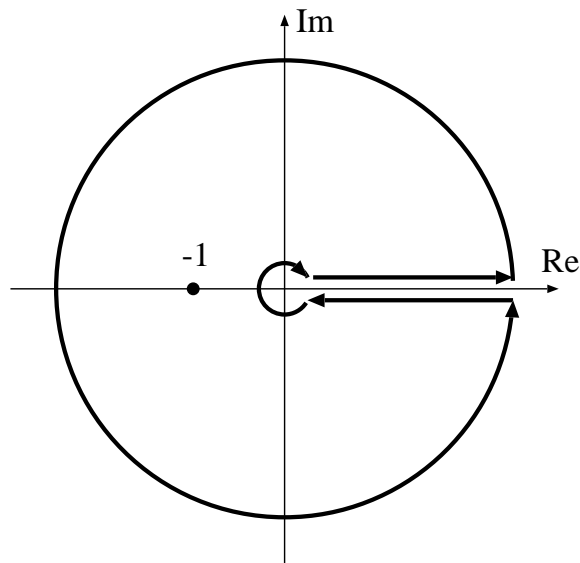


図1

An English Translation:

Complex Functions/Fourier Analysis

1

Answer the following questions.

- (i) Considering the complex integral of $\frac{\log z}{z^3 + 1}$ along the curve in Figure 1, obtain

$$\int_0^{\infty} \frac{1}{x^3 + 1} dx.$$

- (ii) Considering the complex integral of $\frac{(\log z)^2}{z^3 + 1}$ along the curve in Figure 1, obtain

$$\int_0^{\infty} \frac{\log x}{x^3 + 1} dx.$$

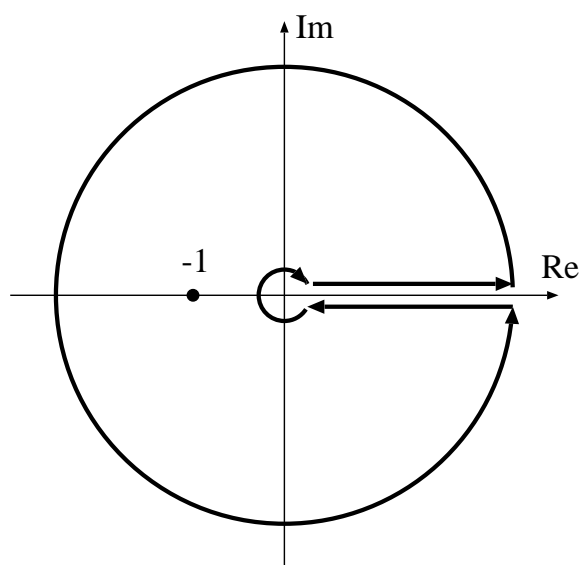


Figure 1