THE MISTAKES BY CAUCHY

WU SHENG-PING

For the zeta function [1] we have

$$A := \int_C dx \frac{x^{s-1}}{e^x - 1}$$

analytic in the whole complex plain, but for $s > 1$

$$A = \int_0^\infty dx \frac{x^{s-1} - (e^{2\pi i} x)^{s-1}}{e^x - 1}$$

for great n

$$|A^{(n)}(s)| > |C' \int_0^1 dx \ln^n x (x^{s-1} - (e^{2\pi i} x)^{s-1})/x| > C|1 - e^{2(s-1)\pi i}|n!/|(s-1)^n|, C > 0.1$$

This means it has convergent radium $|s-1|$. Use this function we can easily to deny the Cauchy's theorem. The proof mistakes in that: we should make double integral limit of partition and integral circle, to ensure the limit of the addition of four things: the linear integration of circles and it's errors, and the integration of area between two circles and its errors. At last we find the proof is inaccessible.

References

[1] H. M. Edwards (1974). Riemann's Zeta Function. Academic Press. ISBN 0-486-41740-9.

Wuhan university, Wuhan, China.
E-mail address: sunylock@139.com

Date: Apr 27, 2014.
2010 *Mathematics Subject Classification.* 30B10.