

Inequality (Complex Analysis)

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I tried asking this elsewhere without success. It has been bothering me for awhile:

If $f(\theta)$ is a real-analytic function with period 2π , show there exists numbers $a > 0$ and $M > 0$ such that for all N ,

$$\left| \int_0^{2\pi} f(\theta) d\theta - \frac{2\pi}{N} \sum_{n=1}^N f\left(\frac{2\pi n}{N}\right) \right| \leq M \exp\{-aN\}$$

where the bars of course represent absolute value.

Also, is this a well-known result? Where might I read more?

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