

Covering Lemma on the Unit Sphere and Application to the Fourier--Laplace Convergence

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摘要

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Abstract

A covering lemma on the unit sphere is established and then is applied to establish an almost everywhere convergence test of Marcinkiewicz type for the Fourier--Laplace series on the unit sphere which can be stated as follows:

Theorem Suppose $f \in L(\Sigma_{n-1})$, $n \geq 3$. If f satisfies the condition

$$\frac{1}{\theta^{n-1}} \int_{D(x, \theta)} |f(y) - f(x)| dy = O\left(\frac{1}{|\log \theta|}\right), \text{ as } \theta \rightarrow 0+,$$

at every point x in a set E of positive measure in Σ_{n-1} , then the Cesàro means of critical order $\frac{n-2}{2}$ of the Fourier--Laplace series of f converge to f at almost every point x in E .

Key words [sphere](#) [covering lemma](#) [Fourier--Laplace series](#) [a.e. convergence](#)

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