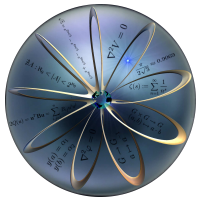

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Paley-Wiener theorem

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Let $f(z)$ be an entire function such that $|f(z)| \leq Ke^{\gamma|z|}$ for some $K \geq 0$ and $\gamma > 0$. If the restriction of f to the real line is in $L^2(\mathbb{R})$, then there exists a function $g(t) \in L^2(-\gamma, \gamma)$ such that

$$f(z) = \frac{1}{\sqrt{2\pi}} \int_{-\gamma}^{\gamma} g(t) e^{izt} dt$$

for all z.