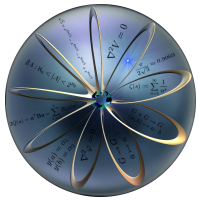

planetmath.org

Math for the people, by the people.

Balian-Low

Canonical name	BalianLow
Date of creation	2013-03-22 15:35:12
Last modified on	2013-03-22 15:35:12
Owner	swiftset (1337)
Last modified by	swiftset (1337)
Numerical id	4
Author	swiftset (1337)
Entry type	Theorem
Classification	msc 42C10

Theorem 1 (Balian-Low) *Suppose $g \in L^2(\mathbb{R})$ and $g_{m,n}(x) = e^{2\pi imx} g(x - n)$, where $m, n \in \mathbb{Z}$. If $\{g_{m,n} : m, n \in \mathbb{Z}\}$ is an orthonormal basis for $L^2(\mathbb{R})$, then either*

$$\int_{-\infty}^{\infty} x^2 |g(x)|^2 \, dx = \infty \text{ or } \int_{-\infty}^{\infty} \xi^2 |\hat{g}(\xi)|^2 \, d\xi = \infty.$$