

The Wavelet Existence Problem

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The wavelet existence problem asks for which pairs (A, Γ) there exists a function ψ such that $\{|A|^{j/2}\psi(A^j x + k) : j \in \mathbb{Z}, k \in \Gamma\}$ is an orthonormal basis for $L^2(\mathbb{R}^n)$. The problem is solved in this full generality only in dimension 1. In this talk, I will present some history of the problem, together with some recent results that provide an intriguing connection to the geometry of numbers.