Morlet wavelets in quantum mechanics

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Wavelets offer significant advantages for the analysis of problems in quantum mechanics. Because wavelets are localized in both time and frequency they avoid certain subtle but potentially fatal conceptual errors that can result from the use of plane wave or delta function decomposition. Morlet wavelets are particularly well-suited for this work: as Gaussians, they have a simple analytic form and they work well with Feynman path integrals. To take full advantage of Morlet wavelets we need an explicit form for the inverse Morlet transform and a manifestly covariant fo for the four-dimensional Morlet wavelet. We supply both here.

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