Time frequency localization for orthonormal sequences and bases

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ABSTRACT: We will discuss uncertainty principles for orthonormal sequences of functions in $L^2(\mathbb{R}^n)$. In particular we show that there does not exist a basis with bounded time and frequency means and bounded product of dispersions for $L^2(\mathbb{R})$ though it is not difficult to construct an infinite orthogonal sequence with this property. The statement does not hold for $n > 1$ and we describe the dependence of the time frequency localization on the dimension of the space.