4.3.4. Frames of the CWT

Time-Frequency Localization of Wavelet Frames

- Assume that $|\psi|$ and $|\Psi|$ are symmetric and centered about $t = 0$ and $\omega = \omega_0$ respectively $\Rightarrow \psi_{m,n}$ is centered around $t = a_0^{\,m} n b_0$ and around $\pm a_0^{\,-m}\omega_0$ in freq.
- $\langle \psi_{m,n}, f \rangle$ is "the information content" of $f(t)$ near $t = a_0^{\,m} n b_0$ *and* $\omega = \pm a_0^{\,-m}\omega_0$
- Assume $f(t)$ localized in time and frequency.
- Only the coefficients $\langle \psi_{m,n}, f \rangle$ for which $(t,\omega) = \left(a_0^{\,m} n b_0, a_0^{\,-m}\omega_0\right)$ lies within (or is very close to) $[-T,T]\times([-\Omega_1,-\Omega_0]\cup[\Omega_0,\Omega_1])$ are needed for f to be reconstructed up to a good approximation.