Wavelet Sets in $\mathbb{R}^2$
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A subset $E$ of $\mathbb{R}$ is a wavelet set if and only if $\{E+2\pi n | n \text{ an integer}\}$ is a measurable partition of $\mathbb{R}$ and $\{2^n E | n \text{ an integer}\}$ is a 2-dilation “tiler” of $\mathbb{R}$ (modulo Lebesgue null sets). This can be generalized to $\mathbb{R}^2$ (using the matrix $2I$ as the dilation factor and $2\pi(l,m)$, where $l$ and $m$ are integers, for the translation component). We will show a few examples of connected wavelet sets in $\mathbb{R}^2$ as well as explore the existence of wavelet sets in $\mathbb{R}^2$ which are composed of a finite number of rectangles.