Apr 10th, 10:00 AM - 11:00 AM

M-Refinable Extensions of Real Valued Functions

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M-REFINABLE EXTENSIONS OF REAL VALUED FUNCTIONS

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A function is $m$-refinable if it can be written as a linear combination of its $m$-dilates and integer translates. The coefficients of this linear combination form a sequence called the refinement sequence. Let $f : [0, N) \rightarrow \mathbb{R}$ and pick a sequence of real numbers $\{c_i\}_{i=0}^{N}$ so that $c_0, c_N \neq 0$. Then a unique function $\bar{f} : \mathbb{R} \rightarrow \mathbb{R}$ can be constructed so that $\bar{f}|_{[0, N)} = f$ and $\bar{f}$ is refinable with refinement sequence $\{c_i\}_{i=0}^{N}$. The construction of $\bar{f}$ suggests a method for characterizing all compactly supported $m$-refinable functions.