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Existence and exactness of exponential Riesz sequences and frames for fractal measures

We study the construction of exponential frames and Riesz sequences for fractal measures using the idea of frame towers and Riesz-sequence towers. We show that the exactness and overcompleteness of the constructed exponential frame or Riesz sequence is completely classified in terms of the cardinality at each level of the tower.

Furthermore, using a version of the solution of the Kadison-Singer problem, known as the R_ϵ-conjecture, we show that all these measures contain exponential Riesz sequences of infinite cardinality. When the measure is the middle-third Cantor measure, or more generally for self-similar measures with no-overlap condition, there are always exponential Riesz sequences of maximal possible Beurling dimension. This leads to another positive evidence that middle-third Cantor measures may exist a Fourier frame.

This is a joint work with D. Dutkay and S. Emami