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Optimal stochastic encoding and approximation schemes using Weyl-Heisenberg sets. (English) [Zbl 1033.94001](#)

Feichtinger, Hans G. (ed.) et al., Advances in Gabor analysis. Basel: Birkhäuser (ISBN 0-8176-4239-0/hbk). Applied and Numerical Harmonic Analysis, 259-320 (2003).

The authors study two classes of optimization problems concerning the interaction between stochastic processes and coherent Weyl-Heisenberg sets. One class involves approximation of stochastic signals, the other class refers to signal encoding for transmission in noisy channels. Both problems are studied in continuous and discrete time settings. Explicit solutions are found in the Zak transform domain. The optimizers turn out to be generically ill localized, similar to the no-go Balian-Low theorem. The authors develop a one-dimensional theory but point out that all their results can be easily extended to a higher-dimensional setting virtually without modification.

For the entire collection see [\[Zbl 1005.00015\]](#).

Reviewer: [Richard A. Zalik \(Auburn University\)](#)

MSC:

- [94A12](#) Signal theory (characterization, reconstruction, filtering, etc.)
- [68P30](#) Coding and information theory (compaction, compression, models of communication, encoding schemes, etc.) (aspects in computer science)
- [60G10](#) Stationary stochastic processes
- [42C40](#) Nontrigonometric harmonic analysis involving wavelets and other special systems

Cited in **3** Documents

Keywords:

Weyl-Heisenberg frames; Riesz bases; Wiener amalgam spaces; stochastic signals; signal transmission; optimization; Zak transform; Balian-Low theorem; discrete time-signal approximation; continuous-time signal approximation; continuous-time signal encoding; discrete-time signal encoding; stationary processes; signal reconstruction; perturbation