

AN ALGORITHM FOR NONHARMONIC SIGNAL ANALYSIS USING DIRICHLET SERIES ON CONVEX POLYGONS *

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Abstract. This article presents a new algorithm for nonharmonic signal analysis using Dirichlet series

$$f(z) = \sum_{\lambda \in \Lambda} \kappa_f(\lambda) \frac{e^{\lambda z}}{L'(\lambda)}, \quad z \in D$$

on a convex polygon D as a generalization of Fourier series. Here L denotes a quasipolynomial whose set of zeros Λ generates a Riesz basis $\mathcal{E}(\Lambda) := \left\{ \frac{e^{\lambda z}}{L'(\lambda)} \right\}_{\lambda \in \Lambda}$ of the Smirnov space $E^2(D)$. The algorithm is based on a simple form of L and on numerical properties of the dual basis of $\mathcal{E}(\Lambda)$.

Key words. nonharmonic Fourier series, Dirichlet series, signal analysis, time series analysis.

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