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FRACTAL TRIGONOMETRIC APPROXIMATION *

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Abstract. A general procedure to define nonsmooth fractal versions of classical trigonometric approximants is proposed. The systems of trigonometric polynomials in the space of continuous and periodic functions $\mathcal{C}(2\pi)$ are extended to bases of fractal analogues. As a consequence of the process, the density of trigonometric fractal functions in $\mathcal{C}(2\pi)$ is deduced. We generalize also some classical results (Dini-Lipschitz's Theorem, for instance) concerning the convergence of the Fourier series of a function of $\mathcal{C}(2\pi)$. Furthermore, a method for real data fitting is proposed, by means of the construction of a fractal function proceeding from a classical approximant.

Key words. iterated function systems, fractal interpolation functions, trigonometric approximation

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