

FRACTAL TRIGONOMETRIC APPROXIMATION *

M. A. NAVASCUES[†]

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

AMS subject classifications. 37M10, 58C05

*Received June 15, 2004. Accepted for publication January 24, 2005. Recommended by R. Varga.

[†]Dept. Matemática Aplicada, Centro Politécnico Superior de Ingenieros, Universidad de Zaragoza, C/ María de Luna 3, 50018 Zaragoza, Spain (manavas@unizar.es).