Fractal properties of Bessel equation

(Talk)

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(joint work with Luka Korkut, Darko Žubrinić and Vesna Županović)

The fractal oscillatority of solutions of differential equations at $t = \infty$ is measured by oscillatory and phase dimensions defined through the box dimension. The phase dimension of the solution of the second order differential equation is defined as the box dimension of the graph of the solution plotted in the phase plane. The oscillatory dimension of solutions of Bessel equation has been computed in [2]. In this work, the phase dimension of solutions of Bessel equation has been computed to be equal to $\frac{4}{3}$. Inspired by some generalization of Bessel equation introduced in [2], the phase dimension of solutions of a similar generalization has been computed. As Bessel equation is non-autonomous we also interpret it as a system in $\mathbb{R}^3$.

References:

1. Luka Korkut, Domagoj Vlah, Darko Žubrinić and Vesna Županović, Fractal properties of a class of spiral trajectories in $\mathbb{R}^3$ and applications, preprint.

2. Mervan Pašić, Satoshi Tanaka, Fractal oscillations of self-adjoint and damped linear differential equations of second-order, Applied Mathematics and Computation, Vol. 218, 5 (2011), 2281–2293

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