

Fractal geometry of the Markov and Lagrange spectra and their set difference

Carlos Gustavo Moreira¹

¹ (IMPA)

Abstract: We will discuss some recent results on the fractal geometry of the Markov and Lagrange spectra, M and L which are classical objects from the theory of Diophantine approximations, and their set difference. In particular, we discuss recent results in collaboration with Erazo, Gutiérrez-Romo and Romaña, which give precise asymptotic estimates for the fractal dimensions of the Markov and Lagrange spectra near 3 (their smaller accumulation point) and other recent collaborations with Jeffreys, Matheus, Pollicott and Vytnova, in which we prove that the Hausdorff dimension of the complement of the Lagrange spectrum in the Markov spectrum has Hausdorff dimension between 0.593 and 0.796445. Finally we will discuss a work in progress in collaboration with H. Erazo, D. Lima, C. Matheus and S. Vieira aiming to prove that $\inf(M \setminus L) = 3$. We will relate these results to symbolic dynamics, continued fractions and to the study of the fractal geometry of arithmetic sums of regular Cantor sets, a subject also important for the study of homoclinic bifurcations in Dynamical Systems.