The Ergodicity of the Restricted Three-Body Problem: The Hénon-Devaney Map

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Resumo/Abstract:
Hénon's Generating Families and his approach to the Three-Body Problem has been studied exhaustively by different areas. Recently at IMPA, S. Muñoz proved that a two-parameter family derived by these Generating Families is robust transitive. The object I worked with is the map that appears when we look at he asymptotic behavior of the Three-Body Problem as presented by Hénon which in known today as the *Hénon-Devaney map*

H: $\mathrm{R}^2 \setminus \{y = 0\} \to R^2$
(x,y) $\mapsto (x + 1y, y - 1y - x)$

which preserves the Lebesgue measure in the whole plane. This map was explored by Devaney , in which he constructed a topological conjugation to a sub-shift and asked the following question:

Question(1981): Is the Hénon map ergodic with respect to the Lebesgue measure?

In a joint work with Professor Enrique Pujals we were able to give a positive answer to this question and, in the process, we were able to obtain some properties of H, which makes this map a new example of a transformation that has an interesting *infinite* measure and that it is not uniformly hyperbolic, that the origin is related to the classic Restricted Three-Body Problem.