COLLOQUIUM

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Small divisors, continued fractions and stability of orbits
Piccoli divisori, frazioni continue e stabilità delle orbite

Abstract

The problems linked with the so-called "small divisors", i. e. the near resonances of frequencies in a quasiperiodic motion, have been known and studied since the 19th century. Poincaré was not certain about the possibility of overcoming them and only beginning with Siegel's Theorem in 1942 a statisfactory theory of stability of quasiperiodic motions has been developed. In a few cases Yoccoz proved that it's even possible to introduce purely arithmetical functions, built using the continued fraction development of the frequencies, which allow to compute the size of the stability domain of the orbits.

I problemi con i cosiddetti "piccoli divisori", ovvero quasi risonanze tra le frequenze in un moto quasi-periodico, sono conosciuti e studiati fin dal 19esimo secolo. Poincaré non era certo della possibilità di risolverli e solo a partire dal teorema di Siegel nel 1942 si è sviluppata una teoria soddisfacente della stabilità dei moti quasi-periodici. In alcuni casi, come mostrato da Yoccoz, è persino possibile introdurre funzioni puramente aritmetiche, costruite a partire dallo sviluppo in frazione continua delle frequenze, che permettono di calcolare la grandezza del dominio di stabilità delle orbite.

Bio

Stefano Marmi is Full Professor of Dynamical Systems at Scuola Normale Superiore di Pisa since 2003. Previously he was Associate Professor at Università di Udine and Researcher at Università di Firenze. Prof. Marmi studied Physics in Bologna, obtaining a PhD in Theoretical Physics in 1990. He spent research periods, among other universities, at Freie Universität Berlin, Université Paris Sud (Orsay), and Princeton University. He is the author of two books and many important research articles. He received the ISAAC Award in 1999.