Manifolds at the verge of a hyperbolicity breakdown *

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Abstract

We study numerically the disappearance of invariant tori in quasi-periodic systems and identify a scenario for breakdown. In this scenario, the disappearance happens because two invariant directions of the transversal dynamics become close, loosing their regularity.

We have studied two situations. One situation in which the system is dissipative, the invariant torus is attracting, and the merging occurs for two directions – both of them stable – with different rates of growth. Another situation in which the system is conservative, the invariant torus is hyperbolic, and the merging occurs for the stable and unstable directions.

We identify remarkable quantitative regularities, namely that the minimum distance between both invariant directions and the Lyapunov multipliers have power law dependence with the parameters. The exponents of the power laws are universal.

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*oral communication.