

Título: Dragon Kings driven by Local Instability in Chaotic Desynchronization

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Resumo:□

For a long time, extreme events happening in complex systems, such as financial markets, earthquakes, and neurological networks were thought to follow power-law size distributions. More recently, evidence suggests that in many systems the largest and rarest events are different from the other ones. They are dragon kings, outliers that make the distribution deviate upwards from a power law in the tail. Understanding the processes of formation of extreme events and what circumstances lead to dragon kings or to a power-law distribution is an open question and it is a very important one to assess whether extreme events will occur too often in a specific system. In the particular system presented here, a pair of coupled chaotic electronic circuits that fail to remain in a synchronized state, we show that the rate of occurrence of dragon kings is controlled by the value of a parameter related to the local instability of a dominant unstable object present in the phase space of the system. In a similar system, we show that dragon kings do not occur and that the distribution of event sizes is replaced by a "tunable" power law when the instability is weak or removed. Our results support the hypothesis that the dragon kings are caused by local instabilities in the phase space.

Data, horário e local:

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