

# Fraktaler ur kaos

## Fraktaldimension som indikator för divergens hos dubbelpendlar

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### Abstract

In this report, the fractal dimensions of the central borders between the initial conditions of a simulated double pendulum that lead up to any of the weights flipping, and those that do not, were computed and compared to the distribution of maximal Lyapunov exponents (MLE) of the system. Different values for dimension and MLE were obtained through varying the proportions of masses and rod lengths in the double pendulum. Measurements such as maxima, averages, and medians of the maximal Lyapunov exponents obtained in each variation, were plotted against box and compass dimensions of the fractal center border with each data point corresponding to a unique combination of mass and length proportions. A strong correlation between dimension and MLE measures was found over a multitude of measurements for MLE, suggesting that systems with a higher rate of divergence on average produce higher box and divider dimension.