

Linear Chaos Theory

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Chaos is usually thought of as a purely non-linear phenomenon. This is the case for finite-dimensional spaces. In infinite dimensions, however, there may be linear operators which share some of the crucial properties of chaotic maps. These so-called "hypercyclic operators" are the subject of this talk.

We will see a proof why this cannot happen in the finite-dimensional case, some examples of hypercyclic operators (they can be very simple, in a way!) and discuss its connections to chaos. The second part of the talk deals with Grivaux' theorem which states some very natural conditions under which a set is an orbit of a hypercyclic operator in the case that the underlying space is a Banach space.

Time permitting, I will briefly sketch how it can be extended to the more general case of Fréchet spaces.