Why is differentiation chaotic?

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What does one get if one differentiates repeatedly a given function? The theory of linear dynamics studies precisely this kind of question: Which orbits does one get under the action of a continuous linear operator on a Banach space, say? Typically we are interested in periodic orbits, dense orbits, or the related notion of linear chaos. In this talk we will use the differentiation operator $D : f \to f'$ on the space $H(\mathbb{C})$ of entire functions as a guiding principle to present concepts and results in linear dynamics. Setting D in a larger context will allow us to answer the question in the title. We will also report on recent work.