

Michigan Math Club



Thursday at 4pm in EH1360

Free pizza and pop afterwards!

Baby Shark(ovskii) doo doo doo doo doo doo

Karol Koziol • 7 April 2022

Suppose we have a continuous function $f(x)$ from $\mathbb{R}$ to $\mathbb{R}$. Since the domain and codomain are the same, we can feed the output of f back into f to get $f(f(x))$. If we keep repeating this, we get a sequence of real numbers

$$x, f(x), f(f(x)), f(f(f(x))), \dots$$

What can we say about the behavior of this sequence? Does it ever repeat, or does it go off to infinity? These are the kinds of questions that show up in the mathematical field of **dynamical systems**.

In this talk, we'll discuss a result in this area known as Sharkovskii's theorem, which says (among other things) that if we can find a point x which returns to itself after 3 applications of f , then we can find points of **all** possible orders. We will also try to make sense of the ominous slogan "Period 3 implies chaos".

