

Chaos and Quantum Chaos
Summer term 2021

3. Exercise

(to be presented and discussed on Monday May 3)

3.1 Wanted: Dynamical system

The powers of 2 are given by: $1, 2, 4, 8, 16, 32, 64, \dots$

Taking the first digit gives the infinite sequence: $1, 2, 4, 8, 1, 3, 6, \dots$

Answer the following questions:

1. Will the digit 7 occur in this sequence?
2. Will it occur as often as 8?
3. What is the probability for each digit to occur?

Hint: Find a dynamical system on a 1D torus, which generates the sequence $1, 2, 4, 8, 1.6, 3.2, 6.4, \dots$