

DYNAMICAL SYSTEMS

HOMEWORK #7

[HTTP://WWW.ITS.CALTECH.EDU/~ASGOR/DYNSYS/](http://www.its.caltech.edu/~asgor/dynsys/)

1. Find the box counting dimension of the set

$$E = \{0, \frac{1}{2}, \frac{1}{3}, \dots, \frac{1}{n}, \dots\} \subset \mathbb{R}.$$

2. Construct an example of a Cantor set with large (close to 1) box counting dimension but small (close to 0) thickness (use Moran's formula).
3. Give an example of a hyperbolic set Λ such that periodic points are not dense in Λ .
4. Let Λ_i be a hyperbolic set of $f_i : U_i \rightarrow M_i$, $i = 1, 2$. Prove that $\Lambda_1 \times \Lambda_2$ is a hyperbolic set of $f_1 \times f_2 : U_1 \times U_2 \rightarrow M_1 \times M_2$.
5. Prove that any contracting C^1 -diffeomorphism of \mathbb{R} is topologically conjugated to a linear contraction.