

DYNAMICAL SYSTEMS

HOMEWORK #3

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

Set $f : S^1 \rightarrow S^1$, $f(\phi) = \phi + \frac{1}{100} \sin 2\pi\phi \pmod{1}$.

1. Find $\Omega(f)$, $C(f)$, and Milnor's attractor of f .

Consider $F : \mathbb{T}^2 \rightarrow \mathbb{T}^2$, $\mathbb{T}^2 = S^1 \times S^1$, $F = f \times f$, and $G : \mathbb{T}^2 \rightarrow \mathbb{T}^2$, $G = f \times R_\alpha$, where R_α is an irrational rotation of S^1 .

2. Find $\Omega(F)$, $C(F)$, and Milnor's attractor of F . The same for G .
3. Is the rotation of a circle $R_\alpha : S^1 \rightarrow S^1$ structurally stable?
4. Prove that $E_2 : S^1 \rightarrow S^1$ has an invariant subset homeomorphic to a Cantor set.
5. Is it possible to find a topological conjugacy between $\sigma_3 : \Sigma_3 \rightarrow \Sigma_3$ and $\sigma_2 : \Sigma_2 \rightarrow \Sigma_2$? Semiconjugacy?