

Talks

1) **Maps to explore.** For the following maps, find the periodic points and classify them as attracting, repelling, or indifferent. Describe the *global* dynamics.

a) $x \longrightarrow x^2 - x \quad x \in \mathbf{R}$

b) $x \longrightarrow 2(x - x^2) \quad x \in \mathbf{R}$

c) $x \longrightarrow \cos x \quad x \in \mathbf{R}$

d) $x \longrightarrow \cos(\pi x) \quad x \in \mathbf{R}$

2) **Homeomorphism dynamics.**

a) Suppose $f : [a, b] \longrightarrow [a, b]$ is a homeomorphism. (One-to-one and onto with continuous inverse.) What can you say about the periodic points of f ? That is, must it have periodic points? If so, what period? Describe the global dynamics of f .

b) Show that a homeomorphism $f : \mathbf{R} \longrightarrow \mathbf{R}$ can fail to have fixed points. Describe the global dynamics of such a map.