APMA 1360: Applied Dynamical Systems

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Motivations - Applications + Phenomena

Bifurcation theory: How do systems change as parameters change?

Examples:

- Mechanical systems (e.g. what will happen to a bead as an apparatus is rotated at velocity ω?)
- Chemical reactions (e.g. Belusov-Zhabotinsky reaction - oscillations in chemical reactions)
- Tipping points (e.g. climate change, convection currents)
- Population dynamics (e.g. predator-prey models, outbreaks)
- Synchronization (e.g. firefly synchronous lighting, brain activity patterns)
- Chaotic dynamics (e.g. double pendulum)