

Mathematical Foundations of Neuroscience - Sample Questions - Lecture 12 - Synchronization

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Questions marked with * are not obligatory.

1. What is the phase model, and what are the motivations behind its introduction?
2. What is an Isochron? What are the properties of Isochrons?
3. What is the PRC (phase resetting curve)?
4. What is the Poincaré phase map? How do properties of the map translate to synchrony regimes?
5. Given the map below, sketch a trajectory departing from any starting point. Is there any chance the corresponding oscillator synchronizes to the forcing signal?

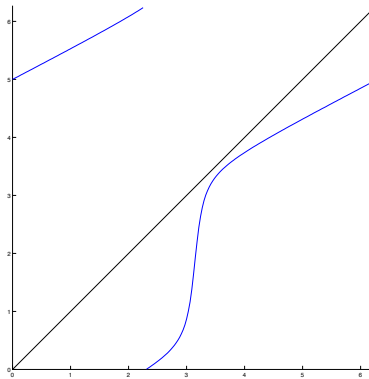


Figure 1: Sample phase map.

6. Sketch prove that the Floquet multiplier indeed captures the stability properties of map equilibria (*).