The ability of circadian oscillators to entrain to light-dark cycles is well known. The process of circadian entrainment has been studied by various methods from dynamical systems. Recently, a tool called the entrainment map was introduced to analyze the entrainment process (Diekman & Bose, 2016). We develop a 2-D entrainment map to study coupled circadian oscillators. The entrainment map is quite well known.

"The direction of entrainment is not necessarily monotonic. Apply the entrainment map to other cases of the coupled network with feedback. Develop entrainment maps for more general models of periodic forced oscillators. Entrainment time calculations provide a way to locate and approximate stable and unstable periodic orbits. We analyzed the time of entrainment and the direction of entrainment by studying the properties of the map. The direction of entrainment is not necessarily monotonic. Entrainment maps provide a way to locate and approximate stable and unstable manifolds. The full iterates are shown on the right.

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Introduction

The coupled Novak-Tyson model

The 1-D pre-entrained map

The 2-D entrainment map

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