

Transient Dynamical Indicators of Critical Transitions

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January 6, 2022

Abstract

Replace the text here with your abstract.

Keywords: tipping point, critical transition, critical slowing down, early warning signals, resilience, intensity of attraction

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1 Introduction

1.1 Critical Transitions

A tipping point or critical transition occurs in a dynamical system when a small perturbation to the system causes an abrupt qualitative shift in overall behavior. This informal concept is often understood as a local bifurcation, but may also correspond to a variety of other dynamical behaviors including global bifurcations, perturbations pushing a state variable across the boundary between two basins of attraction, and rate-induced tipping.

Empirically, critical transitions have been studied in contexts ranging from Earth's climate [2] to emerging infectious disease [1] to

In complex empirical systems, the conditions under which a critical transition occurs are generally extremely difficult to predict. In many cases, the underlying mechanisms driving such a system toward the brink may be impossible to fully understand or identify.

1.2 Motivation

[?]

2 Resilience Quantification

2.1 Asymptotic Resilience

2.2 Width of Basin of Attraction

2.3 Reactivity

2.4 Intensity of Attraction

3 Critical Slowing Down

3.1 Local Bifurcation

3.2 Critical Slowing Down

3.3 Early Warning Signals

4 Transient Dynamical Indicators of Critical Transitions

4.1 Indicators from Reactivity

4.2 Possibility for Indicators from Intensity of Attraction

5 Thesis Proposal

5.1 Continuity of Intensity of Attraction

5.2 Intensity through Critical Transitions

5.3 Further Possibilities

References

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