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Title:

An Algebraic Framework for Describing and Studying Binary Enzymatic Networks

Abstract:

We present a framework to describe and reason about enzymatic networks. The initial motivation for this construct was to extend examples from the literature into the following theorem: a binary enzymatic network that is futile and cascaded is persistent, i.e. molecular species do not tend to extinction. The framework provides mathematically sound and biochemically applicable definitions for the notions of futile enzymatic cycles and enzymatic cascades, and several prerequisite concepts. The framework could be used to prove more results, or even to help assess the plausibility of models of enzymatic networks during their design.

Keywords:

Reaction Network; Enzyme; Futile Enzymatic Cycle; Enzymatic Cascade; Persistence