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(G) (POS-38) Inferring biochemical reaction rates from stochastic fluctuations in growing and dividing cells

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We previously introduced an innovative method to convert the co-variability of a pair of species in biochemical networks into biochemical reaction rates without perturbation experiments or relying on time-related data. We demonstrated this method through numerical demonstrations in previous work. However, our previous examples only addressed fluctuations in stationary states of models that overlooked cell division, approximating cellular growth as first-order dilution. In this work, we further exploit non-stationary models involving growing and dividing cells with our previous method. We provide numerical demonstrations where fluctuations in non-stationary systems effectively enabled the inference of rate functions between stochastically interacting elements.

Keyword-1

Fluctuation analysis

Keyword-2

Inference methods

Keyword-3

Complex networks

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