

Abstract Submitted
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On Path Attractors, Stochastic Bifurcation and Dephasing In Genetic Networks DAVIT POTOYAN, Rice University — Gene regulatory networks are driven stochastic systems with the noise having two distinct components due to the to birth and death of metabolite molecules and dichotomous nature of gene state switching. Presence of dichotomous gene noise alone has the capacity to significantly perturb the optimal transition paths and steady state probability distributions compared to the macroscopic models and their weak noise approximations. Most importantly dichotomous gene noise can also lead to multimodal distributions due to stochastic bifurcation of the underlying nonlinear dynamical system, which underlies the mechanism of formation of population heterogeneity. In this note we derive approximate path based expression of the time dependent probability of gene circuits which enables deeper exploration of the role of gene noise in formation of epigenetic states and dephasing-like phenomena.

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