

Abstract Submitted
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Protocols for discriminating sources of intrinsic noise in gene expression NIRAJ KUMAR, RAHUL KULKARNI, Department of Physics, University of Massachusetts Boston, Boston, MA 02125 — The intrinsic stochasticity of gene expression leads to heterogeneity of protein levels across a population of cells. Different molecular mechanisms have been proposed that contribute to this variability in protein levels. Among these are Poissonian fluctuations of mRNAs, promoter fluctuations based on a random telegraph process, and general waiting-time distributions (“gestation”) for the arrival of mRNAs. Given these different sources, an important problem in the field is the development of protocols for discriminating the dominant molecular mechanisms giving rise to the observed noise. Considering the “burst” limit (for which mRNA lifetimes are much shorter than protein lifetimes) we develop protocols for discriminating the sources of intrinsic noise based on accessible experimental measurements. Computational validation of these protocols indicates that they could lead to promising experimental approaches for discriminating the sources of intrinsic noise in gene expression.

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