

## Noise Effects on Oscillator Network of Transcription Regulators

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Abstract: Based on the model describing the regulation of the  $P_{RM}$  operator region of  $\lambda$  phage proposed by Jeff Hasty et al., we study the noise effects on the oscillator network. We find that the additive noise cannot change the period and the amplitude of the relaxation oscillator, but in the multiplicative case, the period of the relaxation oscillator increases to a constant value with the increase of the strength of noise, and the amplitude of the relaxation oscillator also shows increases with the increase of the strength of noise. This novel results suggest that an external multiplicative noise source could be used to control gene expression.

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Key words: gene control, noise strength, oscillator

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