

# Stochastic gene expression models, and extension to multiscale cell differentiation models

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In this talk, I will present stochastic models of self-regulating gene expression (Figure 1). I will present limiting procedure that allows to reduce the dimension of the models (Yvinec et al. (2013); Yvinec (2013)). Some of the limiting models obtained are piecewise deterministic Markov models, and faithfully reproduce the so-called bursting phenomena. I will show that these reduced models can be studied in details: asymptotic convergence, bifurcation, parameter estimation through inverse problem (Mackey et al. (2011, 2012)). I will explain how such study may have implications on the understanding of gene regulation mechanisms.

Finally, I will briefly sketch a possible strategy to extend gene regulation models to include cell population effects, and discuss its relevance for cell differentiation models.

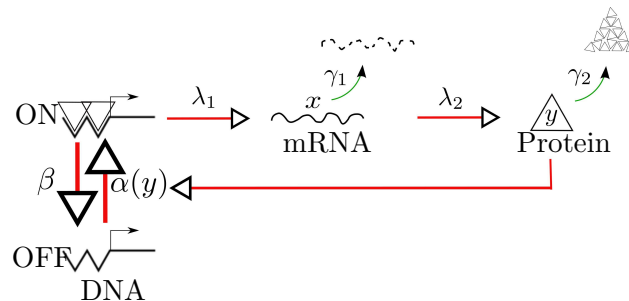


Figure 1: Self-regulated gene

## References

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