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Gaussian approximations for stochastic processes with delay

Many systems modelled in biology have memory: not all of the effects of interactions can be well approximated as occurring instantaneously. For such processes it is not straightforward to formulate Master equations. We demonstrate how progess can be made using a path-focused view, based on generating functionals. We derive analytical expressions for Gaussian approximations for a wide class of delay systems, and apply them to a selection of biologically motivated problems.

References: T. Brett, T. Galla, Phys. Rev. Lett. 110 250601 (2013); T. Brett, T. Galla, J. Chem. Phys 140 124112 (2014).