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Gillespie.jl: Stochastic Simulation Algorithm in Julia

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Software

- Review
- Repository
- Archive

Summary

`Gillespie.jl` (Frost 2016) is a Julia package for stochastic simulation using Gillespie's direct method (sometimes called the Doob-Gillespie algorithm) (Doob 1945; Gillespie 1977), an approach widely used in many fields, including systems biology and epidemiology. It borrows the basic interface (although none of the code) from the R library `GillespieSSA` by Mario Pineda-Krch (Pineda-Krch 2008), although `Gillespie.jl` only implements the standard exact method at present, whereas `GillespieSSA` also includes other methods, such as tau-leaping, *etc.*. `Gillespie.jl` is intended to offer performance on par with hand-coded C code, while maintaining a simple but flexible interface.

References

Doob, Joseph L. 1945. "Markoff Chains–Denumerable Case." *Transactions of the American Mathematical Society* 58 (3). JSTOR: 455–73. doi:10.2307/1990339.

Frost, Simon D.W. 2016. "Gillespie.jl: Stochastic Simulation in Julia." https://github.com/sdwfrost/Gillespie.jl.

Gillespie, Daniel T. 1977. "Exact Stochastic Simulation of Coupled Chemical Reactions." *The Journal of Physical Chemistry* 81 (25). ACS Publications: 2340–61. doi:10.1021/j100540a008.

Pineda-Krch, Mario. 2008. "GillespieSSA: Stochastic Simulation Algorithm in R." *Journal of Statistical Software* 25: 12. doi:10.18637/jss.v025.i12.