pipeline: TODO

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ABSTRACT

TODO!!! The code is available online at http://mussles.github.io/pipeline/ under the GNU General Public License v3.

Subject headings: methods: statistical — methods: Markov chain Monte Carlo — TODO

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Note: If you want to get started immediately with the pipeline *package, start at Appendix* **??** *on page* **??** *or visit the online documentation at* https://mussles.github.io/pipeline. *If you are sampling with* pipeline *and having low-acceptance-rate or other issues, there is some advice in Section* **??** *starting on page* **??**.

1. Introduction

Throughout previous years of development, Markov chain Monte Carlo (MCMC) has evolved from a foregone algorithm to a more general way to fit real-life data.

2. The Algorithm

One of the most commonly used MCMC algorithms is the Adaptive Metropolis-Hastings Algorithm (AM), first proposed by Haario, et al. in their *An Adaptive Metropolis Algorithm* **?**. In their paper, they propose an algorithm that streamlines the task of setting the step-size, comparing to the arduous process outlined in the original algorithm. The original algorithm was introduced by Metropolis and Hastings, respectively, in their separate papers **?** and **?**.

Algorithm 1 Adaptive Metropolis-Hastings algorithm

Draw $X^0 \sim \mu$ where μ is the initial condition.
Set θ^0 to an arbitrary valid value.
Set $t \leftarrow 0$.
repeat
  Compute $\theta^t = \gamma^t(\theta^0, X^0, \ldots, X^{t-1})$ where γ^t is a transformation that update the parameters based on past samples.
  Draw X^{t+1} using the proposal $q(\cdot|x^t, \theta^t)$ with the Metropolis-Hastings rule.
  Set $t \leftarrow t + 1$.
until The accept rate of the last K iterations are close to 0.234.
Set $\theta \leftarrow \theta^t$.
Perform Algorithm **??** with proposal $q(\cdot|x) = q(\cdot|x, \theta)$.

3. Discussion & Tips

REFERENCES

Haario, H.; Saksman, E.; Tamminen, J. (2001). "An adaptive Metropolis algorithm." Bernoulli, 7(2): 223242.

Metropolis, N., Rosenbluth, A., Rosenbluth, M., Teller, A., and Teller, E. (1953). "Equations of state calculations by fast computing machines." J. Chem. Phys., 21(6): 10871092.

Hastings, W. (1970). "Monte Carlo sampling methods using Markov chains and their application." Biometrika, 57: 97109.

A. Installation

B. Issues & Contributions

The development of pipeline is being coordinated on GitHub at http://github.com/mussles/pipeline and contributions are welcome. If you encounter any problems with the code, please report them at http://github.com/mussles/pipeline/issues and consider contributing a patch.

C. Online Documentation

To learn more about how to use pipeline in practice, it is best to check out the documentation on the website https://mussles.github.io/pipeline. This page includes the API documentation and many examples of possible work flows.