



Figure 1: Estimation using Bayesian MCMC with Metropolis Hasting: Fig. a): the blue histogram is randomly generated from gaussian distribution with $\mu_0 = 0.2$ and $\sigma_0 = 1.4$ with 1000 samples. The red curve is obtained using the frequentist approach, i.e. the point estimate. The estimated μ_{freq} and σ_{freq} are give in purple. The error of σ_{freq} is too difficult to evaluate, and so it is left as if it is unavailable. Fig. b): the prior distribution for μ_{baye} and σ_{baye} , both are gaussians centered at 0 and have standard deviations of 2.0. Fig. c): the trace of MCMC for σ_{baye} is shown by the black curve. There are 10,000 iteration samples. The blue dots represent the MCMC values accepted by the Metropolis Hasting algorithm and the red crosses rejected. The first 1/10 of the iteration are cut out (trimming) to account from the effects of the initial conditions ($\mu_{baye}(t = 0) = 0.0$ and $\sigma_{baye}(t = 0) = 1.0$); about 2/3 of the accepted values are removed (thinning) to mitigate the effect of autocorrelation from the Markov chain; the gaussian drawn from the Monte Carlo shrinks in width (annealing) over iterations for a faster convergence. Fig. d) the samples drawn from the MCMC for a distribution for μ_{baye} and σ_{baye} , whose values and errors are presented in purple. The Bayesian results are consistent with those of the frequentist.