Report 5: Quantum Monte Carlo

Git: https://github.com/simonblaue/MCP-Ex5.git

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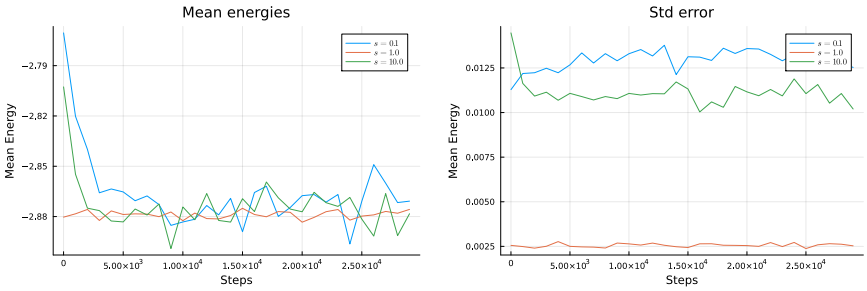
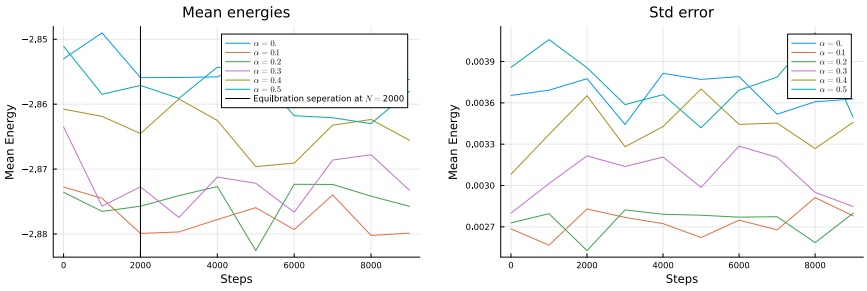
1 Variational Monte Carlo simulation of a Helium atom

1.1 Investigate stepsize s



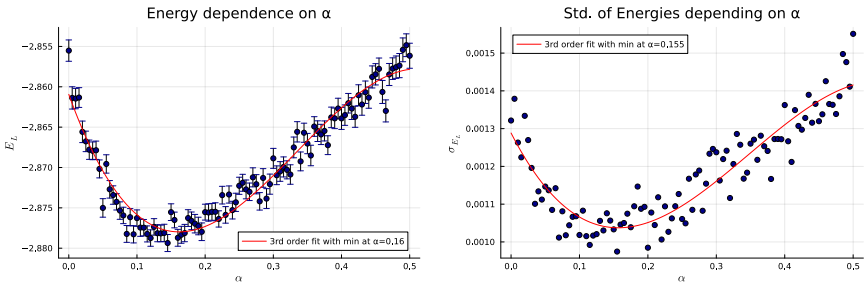
(a) Energies (b) Stds

1.2 Approximating equilibration time



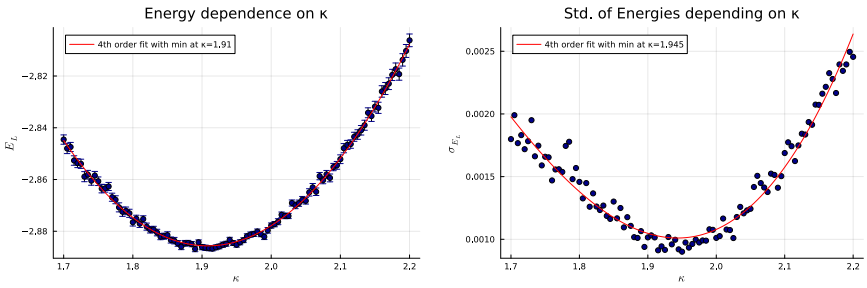
(a) Energies (b) Stds

1.3 Investigate variational parameter α



(a) Energies (b) Stds

1.4 Investigate variational Parameter κ

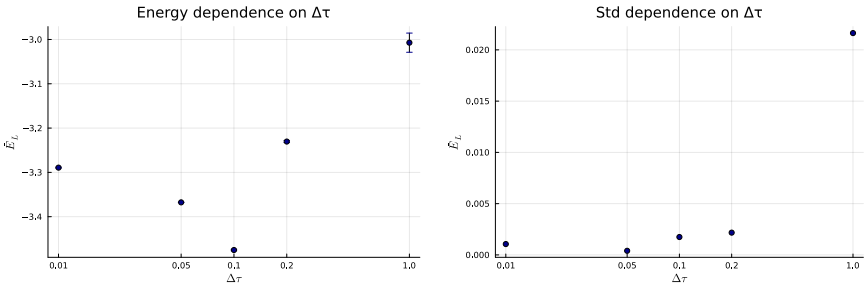


(a) Energies (b) Stds

1.5 Optimizing parameters α, β and κ

Strange stuff happens, optimizing for minimal energie leads to a lower energie as with given params, but higher std...

2 Variational Monte Carlo with Fokker-Plank support



(a) Energies (b) Stds

2.1 Quantum force

2.2 Investigate variational parameter $\Delta\tau$

2.3 Electron density

3 Diffusion Monte Carlo simulation of a Helium atom

4 Feynman Path Integral Quantum Mechanics