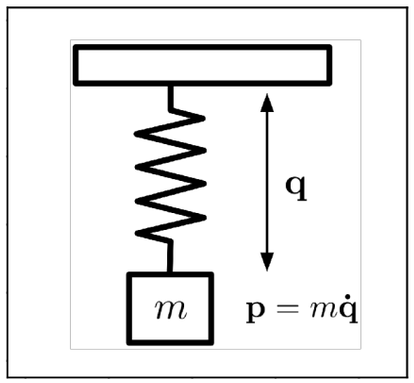
Task 1: Ideal Mass-Spring System

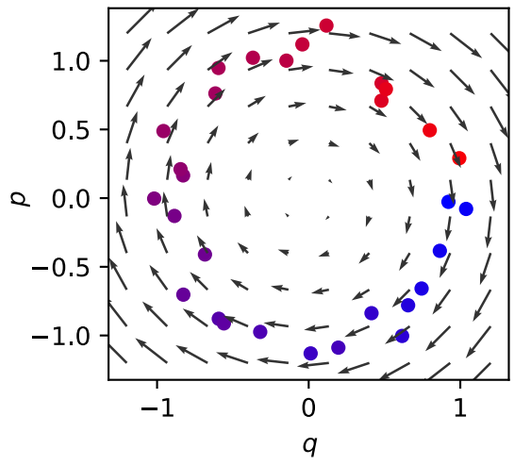
Hamiltonian

$$\mathcal{H} = \frac{1}{2}kq^2 + \frac{p^2}{2m}$$

Ideal mass-spring system



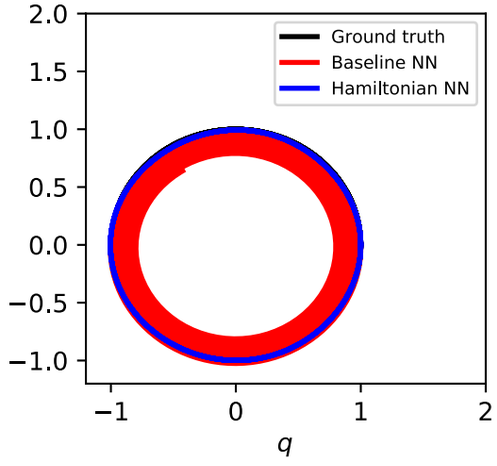
Noisy observations



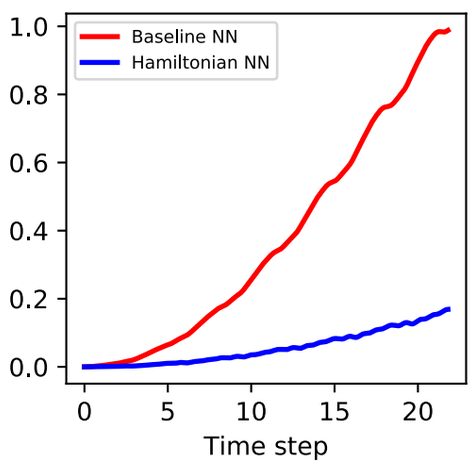
Training settings

- 25 trajectories of 30 observations each
- Adam with 10^{-3} learn rate
- 3 layers of 200 units
- 2000 gradient steps
- `tanh` activations

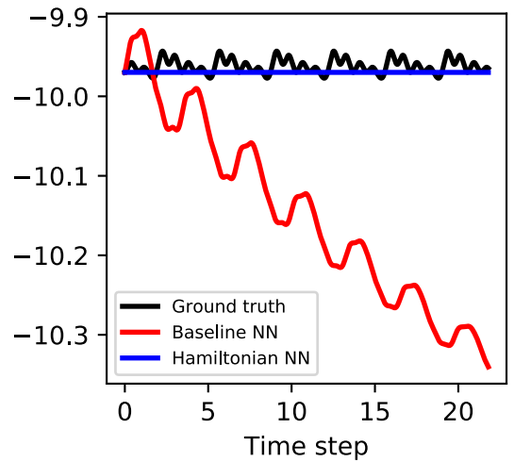
Predictions



MSE between coordinates



Total HNN-conserved quantity



Total energy