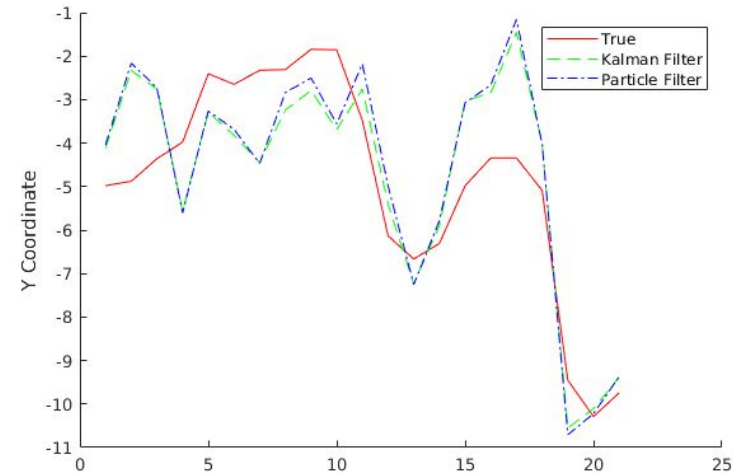
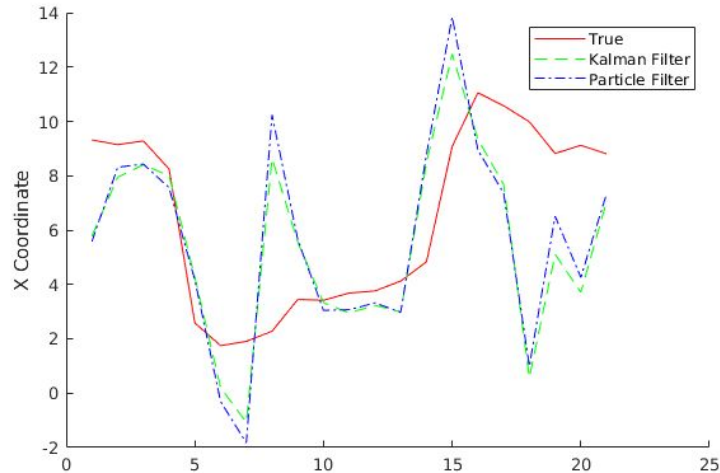


Performance of Different Emission Probabilities for BMIs

Comparison between Particle Filter and Kalman Filter

- Kalman: 0.16ms per time step, SNR: 3.98db
- Particle (800 Filters) 2.1ms per time step, SNR: 3.68db



Different Emission Probabilities

$$p(X_t | y_1, y_2, \dots, y_t) = \sum_{n=1}^N \alpha_t^{(n)} \delta(x - x_t^{(n)})$$

Time Update Step:

$$p(X_t | y_1, y_2, \dots, y_t) = \sum_{n=1}^N \alpha_{t-1}^{(n)} p(X_t | x_{t-1}^{(n)})$$

Measurement Step:

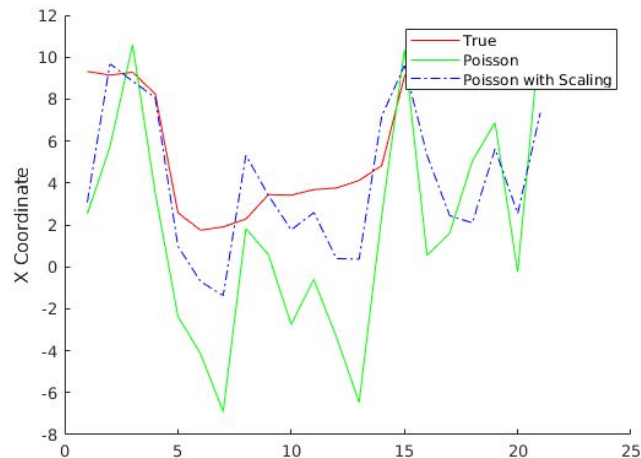
$$\alpha_t^{(n)} \propto q(y_t | x_t^{(n)})$$

Poisson Emission Probabilities

$$y_k^{(n)} \sim \mathcal{P}(\exp(c_k^T x^{(n)} + d_k))$$

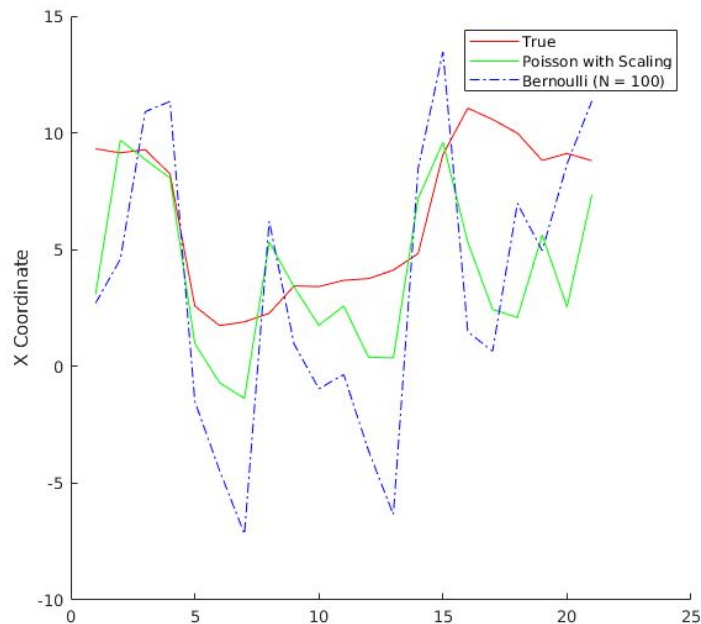
Poisson with additional scaling

$$y_k^{(n)} \sim \alpha_k \mathcal{P}(\exp(c_k^T x^{(n)} + d_k))$$



SNR without scaling: -2.41 dB, with scaling: 0.18dB

Binomial Distribution ... doesn't work



Bernoulli SNR = -2.41dB, Poisson SNR: 0.18dB