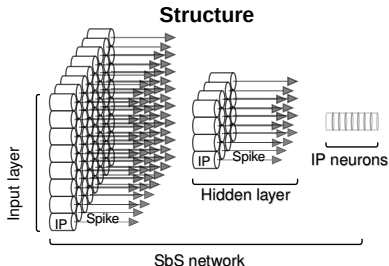
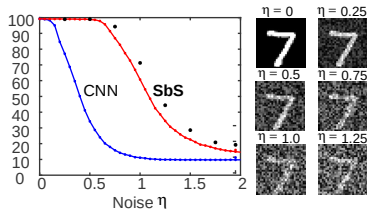


# Spike-by-Spike Neural Network



## Noise robustness



## Properties:

Noise robustness

Iterative optimization

**No sign bit required**

Requires division

Compute and memory intensive

## Neuron update

$$h_{\mu}^{new}(i) = \frac{1}{1 + \epsilon} \left( h_{\mu}(i) + \epsilon \frac{h_{\mu}(i)W(s_t|i)}{\sum_j h_{\mu}(j)W(s_t|j)} \right)$$

Non-negativity  $0 \leq W(s_t|j) \leq 1$

Normalized  $\sum_{s_t=0}^{M-1} W(s_t|j) = 1$