# Event-driven implementation of eligibility propagation

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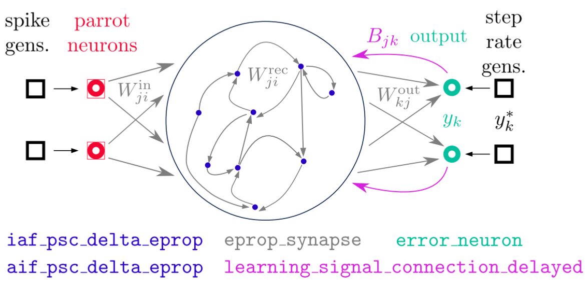
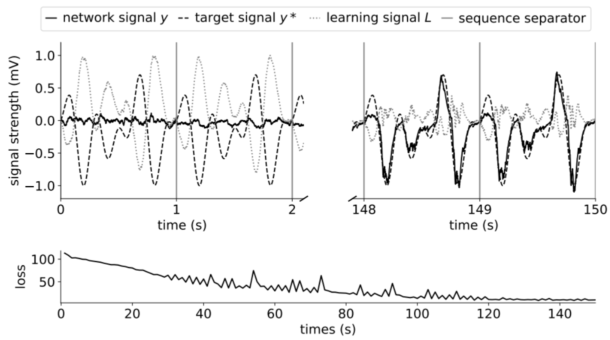
We port eligibility propagation (eprop) [1], a biologically plausible approximation of backpropagation through time for recurrent spiking neural networks, to NEST. Eprop is local in space and time and employs broadcast alignment, i.e., random feedback weights from output neurons to the recurrent network. In contrast to the original fully time-driven implementation in Tensorflow, we show here an implementation that is consistent with the event-driven update of synapses in NEST. Three factors enter this learning rule: the filtered presynaptic spike-trains, the postsynaptic membrane potential, and instructive learning signals emitted by the output neurons. To accumulate the factors until the weight update, we use the NEST archiving infrastructure [2]. As a proof of concept, we demonstrate efficient learning of a regression and a classification task in fully connected networks of a few hundred neurons. We currently study the learning behavior in sparsely connected, Brunel-type [3] networks and larger, more structured networks, like a cortical microcircuit [4].

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