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Synaptic learning rules: a drunk man's walk to remember

The strength of the synapses in the brain are presumably continuously subject to increases and decreases as the result of ongoing learning processes. This realization allows one to approximate the synaptic weight evolution as a stochastic process. This has been used to find fundamental limits of storage (Fusi and Abbott 2007)

Recently we introduced a synaptic information capacity measure based on Shannon information (Barrett and van Rossum). We use this to find the optimal weight dependent learning rules.

We find that soft-bound learning rules are somewhat better than hard bound rules, although the improvement is quite small.