COMPETING SYNAPSES WITH TWO TIMESCALES: A BASIS FOR LEARNING AND FORGETTING

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Competition between synapses arises in some forms of correlation-based plasticity. We have proposed a game theory-inspired [1] model of synaptic interactions [2] : the dynamics is driven by competition between synapses in their weak and strong states, which are characterized by different timescales. The learning of inputs and memory are meaningfully definable in an effective description of networked synaptic populations. We study, numerically and analytically, the dynamic responses of the effective system to various signal types [3], particularly with reference to an existing empirical motor adaptation model [4]. Among the main results of our work is the prediction that memory is optimized if the weak synapses are really weak, and the strong synapses are really strong.