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A new mathematical model for brain memory working. Optimal control behavior for Hopfield networks

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In order to overcome the limitations of classical Hopfield networks in modeling memory workings we propose an optimally controlled asymmetric neural network model. According to the input pattern submitted to the network, the synaptic conductivity weights are updated at every iteration minimizing at the same time the trajectory cost and the weights modification cost. As a result the potentia values at the neurons evolve along an optimally controlled trajectory. It is proven that such a network is able to perform the most plausible memory operations; remembering existing patterns, recording new patterns, aimless wandering without converging to any pattern, deletion and restoration of pattems.

Joint work with F. Cardin, A, Maritan and A, Megighian.

2 dicembre, ore 14:30 **Aula seminari del VIMM**