

HOMEWORK - 05

Computational Neuroscience

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Question : 1

- (a) As the number of memories stored in the system increases, the probability of recovering the memory increases with increasing overlap of initial state of the neuronal assembly to the memory which is to be recovered.

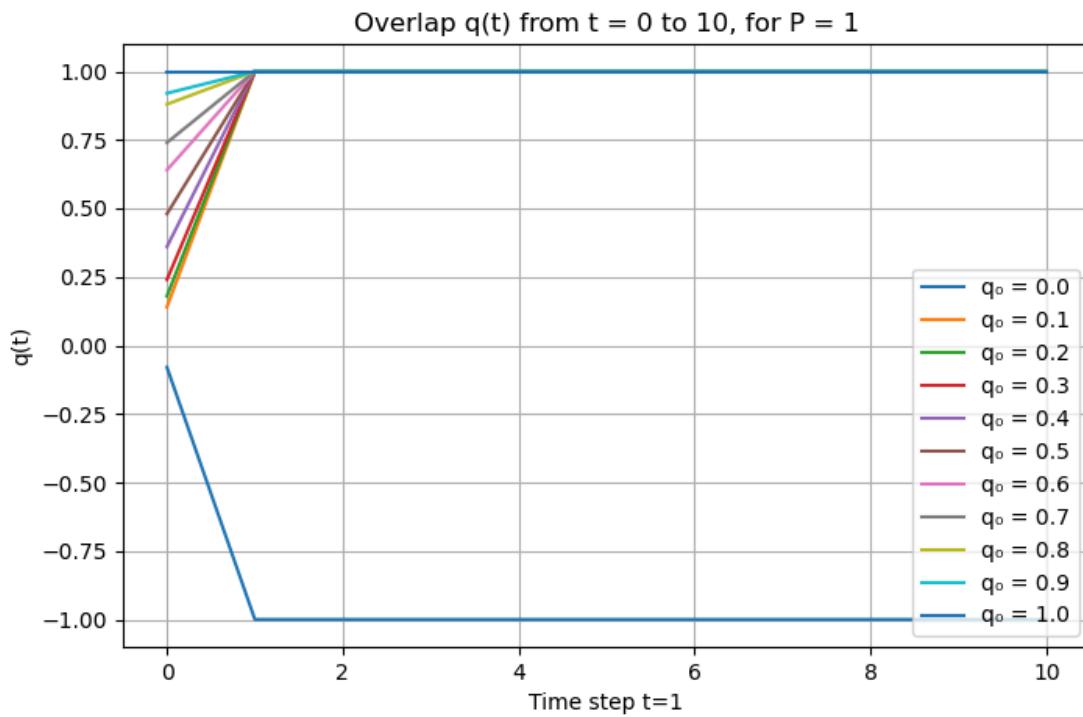


Figure 1: A line graph showing the evolution of the order parameter $q(t)$ over time steps $t=0$ to $t=10$ for various initial conditions q_0 . The y-axis is labeled $q(t)$ and ranges from 0.0 to 1.0. The x-axis is labeled 'Time step t=1' and ranges from 0 to 10. The legend indicates 11 different initial conditions: $q_0 = 0.0$ (blue), $q_0 = 0.1$ (orange), $q_0 = 0.2$ (green), $q_0 = 0.3$ (red), $q_0 = 0.4$ (purple), $q_0 = 0.5$ (brown), $q_0 = 0.6$ (pink), $q_0 = 0.7$ (grey), $q_0 = 0.8$ (olive), $q_0 = 0.9$ (cyan), and $q_0 = 1.0$ (dark blue). The graph shows that for $q_0 < 1.0$, $q(t)$ increases towards 1.0, while for $q_0 = 0.0$, $q(t)$ decreases towards 0.0. The rate of change is highest for $q_0 = 0.0$ and lowest for $q_0 = 1.0$.

- (b) If we consider memory retrieval as recovering 80% of the original network, memory retrieval seems to fail when more than 17 memories are stored in the network.

Average $q(t)$ heatmap for $q_0 = 1.0$ (20 trials per P)

