NEURONS PRODUCE THE SAME OUTPUT APPLICATION: REDUCTION OF THE CONTINUOUS HOPFIELD NETWORKS ASSOCIATED WITH THE MAXCLIQUE PROBLEM

K. Elmoutaouakil

[1] *ENSA Al-Hoceima*

Key words: *Continuous Hopfield networks (CHN), combinatorial problems, equilibrium point, reduction of the architectures of the networks.*

Abstract

The Continuous Hopfield Networks (*CHN*) is composed of one-layer neurons with fully connected synapses. The resolution of the combinatorial problems via the CHN is based on some energy function which diminishes as the system develops until a local minimum value is obtained. The main purpose of this work is to reduce the size of the *CHN* associated with an important subclass of combinatorial problems. The proposed reduction will reduce the size of the *CHN* architecture which satisfied some simple conditions. Under these conditions, we prove that two neurons produce the same output; this effect permits to calculate only the output of one of these neurons, and to give the same value to the other one at the stability. To generalize this procedure, we give an algorithm to decompose the CHN on subsets. From each subset, we take the element with the smallest rank so as to construct a new network with appropriate weights and bias. This method doesn't require a lot of *CPU* time, and it allows the reduction of the CPU time in which we calculate an equilibrium point for the CHN of a large size. This method is applied to the Max Clique Problem MCP. Finely, some experiments results are introduced.