

Many problems in telecommunications are of combinatorial nature and their optimum resolution is impossible in many cases, because the time of resolution by conventional algorithms grows exponentially with the size of the problem. Then, some algorithms of probabilistic nature, like simulated annealing, genetic algorithms, multiagent methods, etc. - suggested by evolutionary natural processes or by the behaviour of insects, are useful to find near optimum solutions in a reasonable time.

In this TFC we have implemented a new method of optimization (applied to graph coloring, base of frequency assignment in GSM). The method is inspired by the social behaviour of some peculiar insects: bumblebees. Each bumblebee codifies a solution to the coloring problem, that while the virtual insects continue their life cycle (they seek and find food, suffer mutations, etc). Then, in a process that simulates the darwinist evolution, good solutions of the problem are found.

The efficiency of this method has been verified by means of a study of random graph coloring and has been compared with other optimization methods like *angels and mortals* and a *genetic algorithm*, coming to the conclusion that it is a valid method for the resolution of problems like frequency assignment in GSM networks.