* 1. **Beez algorithm**

Beez algorithm is an optimization algorithm which uses exploratory local search merged with a global search. It can solve complex optimization problems; for example, in our ICA problem (maximization of cost function), we are faced with a problem of P-1 unknown parameters. like other swarm-based optimization algorithms, beez algorithm (classical type of Beez algorithm) can be illustrated as follows by flowchart in figure 5.

Like what happens in nature inside beehives,

In first step, a certain number of scoutbees (nscoutbees) are sent out of the hive to search for initial food sources (initial solutions) in the desired area. Next, these food sources (solutions) are evaluated and then will be rearrange in order of their costs, descently. In the following, with the way bees do this, in a for loop of MaxIt repetitions, we continue to search around these initial solutions to get the best solution. In this method, the initial rearranged solutions are divided into three parts. The first part, consists of the number of “nElitesites” solutions as elite solutions, second is the next “non-Elitesites” solutions as Non-Elite solutions and the remainder of these initial solutions will be considered ad non selected solution, so these non-selected solutions will be replaced with new random solutions.

It should be noted that, around each of these selected elite solutions, using a uniform random number generator, new solutions generated (assign new bees to elite sites), then we evaluate them and next rearrange them, and finally replace the elitesolutions, with their new best solutions. We repeat this search method for non-Elitesolutions and replace them with their best new solutions.

So we have the number of “nscoutbees” new bees at the end of each for loop and rearranged the based on their costs, which will be replaced by the same number of new best bees in the next loop, bringing us closer to the optimal solution. When we reach the “MaxIt” the optimum solution will bee bee(1) and optimization is done. Note that the convergence of bees algorithm is guaranteed [manbaaaaa].