In order to study the performances of a new heuristic of a problem, one has to make some tests on this heuristic. What need to be tested is the speed and the efficiency of the program when using this new heuristic.

To study the speed, the first step is to try to determine the cost function of the heuristic. This can be done by determining the dominant(s) cost(s), that is the part(s) which are the most executed. Once the dominants costs are determined, it is necessary to estimate the number of times they are executed, according to the parameters of the function by analyzing the code. It is then possible to write the cost formula of the function as the sum of the dominant costs.

Once the cost formula is estimated, it should be verified by doing a number of tests with different parameters, where one will count the number of times each of the dominant costs are called. With the results of these tests, it becomes possible to confirm or invalidate the various elements of the cost formula. Moreover, it become possible to estimate the coefficients of these costs, therefore building a cost formula where the only unknown variables are the parameters.

With the previously calculated cost formula and tests results, it becomes possible to also estimate the time needed for each instruction, and consequently, it becomes possible to estimate the time required for any other inputs, when tested under the same environment with the same conditions. If the estimation diverges widely with the result’s execution time, this may be the proof that some other factors have not been taken into consideration, and the whole process need to be resume.

When a good time estimation of the speed has been done, it becomes necessary to analyze the efficiency of the new algorithm. In that end, it is necessary to determine the cost of the solutions provided by the tested algorithm and compare it with the cost of the optimal solution for the given problem’s instance.

If the optimal solution for a given problem is not available, it is necessary to estimate it. The recommended approach is to use two different solutions which are known to estimate and bounds the optimal solution as closely as possible.

Then, given an upper and a lower bound of the optimal solution, it is possible to compare the costs of these almost optimal solutions with the cost of the solution returned by the tested algorithm. The meaning of the ratios between the given solution and the (nearly) optimal solution is then the average performance indicator of the given algorithm.