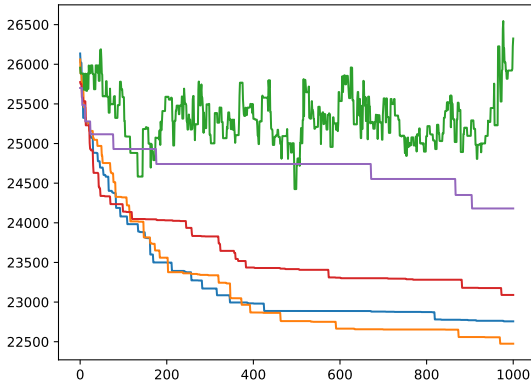


# Comparing heuristics for the Steiner tree problem.

Antoine Huchet

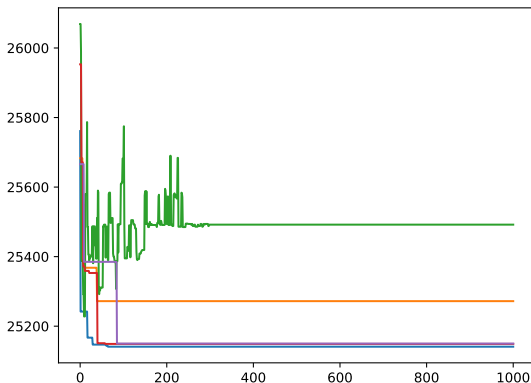
February 15, 2018

## Mutation variation.



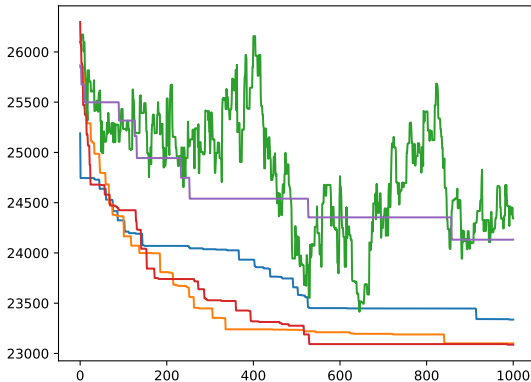
**Figure:** Comparison for  $\lambda = 5$ ,  $\mu = 2$  and mutation variation of classic elitist selection (in blue), elitist selection on offsprings (in orange), fitness proportional (in green), Boltzmann with constant  $T = 1000$  (in red) and Threshold selection with constant parameter  $T = -150$  (in purple)

## Crossover variation.



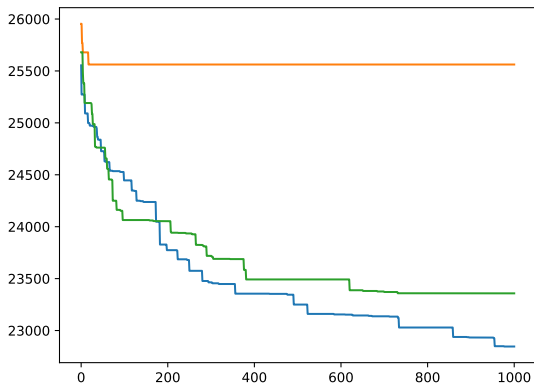
**Figure:** Comparison for  $\lambda = 5$ ,  $\mu = 2$  and crossover variation of classic elitist selection (in blue), elitist selection on offsprings (in orange), fitness proportional (in green), Boltzmann with constant  $T = 1000$  (in red) and Threshold selection with constant parameter  $T = -150$  (in purple)

Both variations.



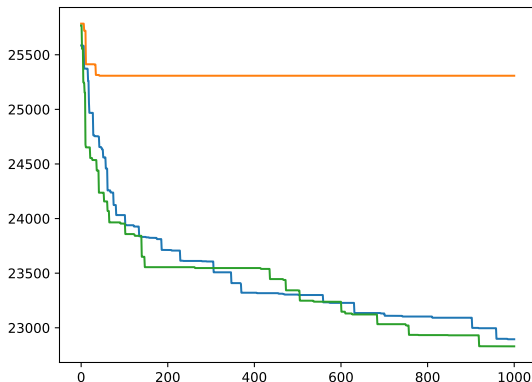
**Figure:** Comparison for  $\lambda = 5$ ,  $\mu = 2$  and multiple variation of classic elitist selection (in blue), elitist selection on offsprings (in orange), fitness proportional (in green), Boltzmann with constant  $T = 1000$  (in red) and Threshold selection with constant parameter  $T = -150$  (in purple)

## Elitist selection.



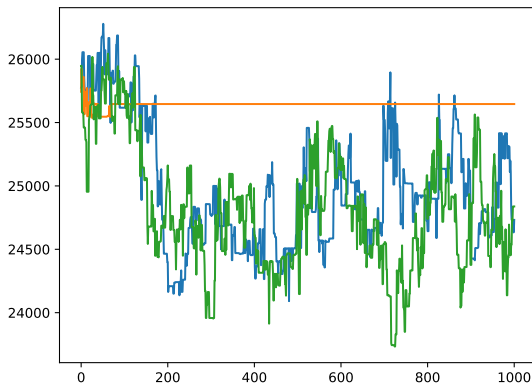
**Figure:** Comparaison for  $\lambda = 5$ ,  $\mu = 2$  and classic elitist selection of mutation variation (in blue), crossover variation (in orange) and another variation consisting of a mix of both (in green).

## Elitist offsprings selection.



**Figure:** Comparaison for  $\lambda = 5$ ,  $\mu = 2$  and offsprings elitist selection of mutation variation (in blue), crossover variation (in orange) and another variation consisting of a mix of both (in green).

## Fitness selection.



**Figure:** Comparison for  $\lambda = 5$ ,  $\mu = 2$  and Fitness proportional selection of mutation variation (in blue), crossover variation (in orange) and another variation consisting of a mix of both (in green).

Boltzmann selection for constant  $T = 1000$ .

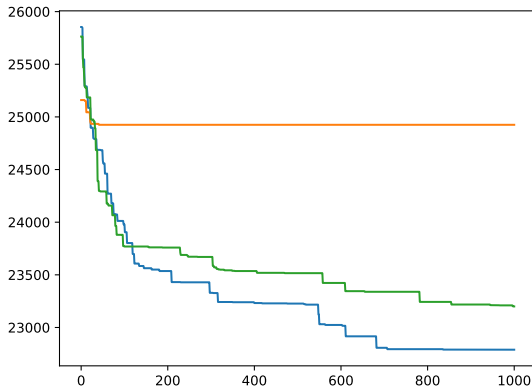
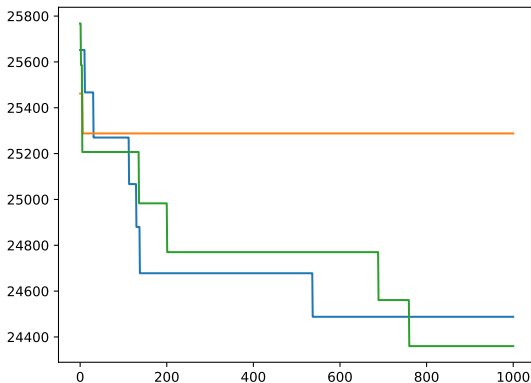


Figure: Comparaison for  $\lambda = 5$ ,  $\mu = 2$  and Boltzmann selection with constant parameter  $T = 1000$  of mutation variation (in blue), crossover variation (in orange) and another variation consisting of a mix of both (in green).

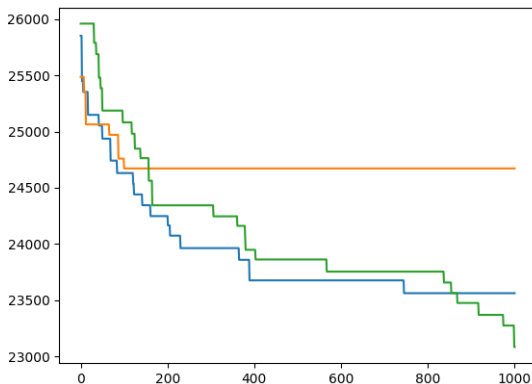


## Threshold selection with $T = -150$ .



**Figure:** Comparison for  $\lambda = 5$ ,  $\mu = 2$  and threshold selection with constant parameter  $T = -150$  of mutation variation (in blue), crossover variation (in orange) and another variation consisting of a mix of both (in green).

Threshold selection with  $T = -80$ .



**Figure:** Comparison for  $\lambda = 5$ ,  $\mu = 2$  and threshold selection with constant parameter  $T = -80$  of mutation variation (in blue), crossover variation (in orange) and another variation consisting of a mix of both (in green).

## Final heuristic.

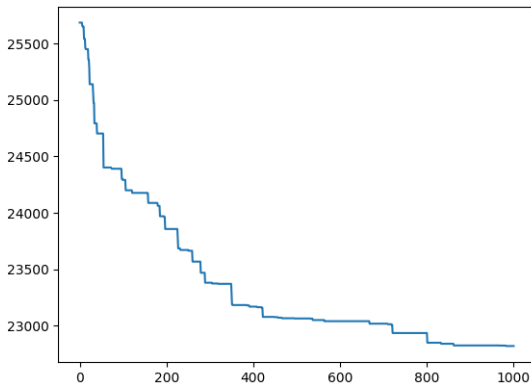


Figure: Comparaison for  $\lambda = 11$ ,  $\mu = 3$  and Boltzmann selection with constant parameter  $T = 1000$  and mutation variation (in blue)