

Travelling Thief Problem (Multi-Objective)

Evolutionary Computation

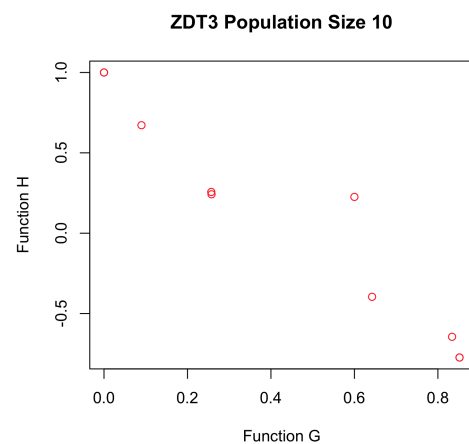
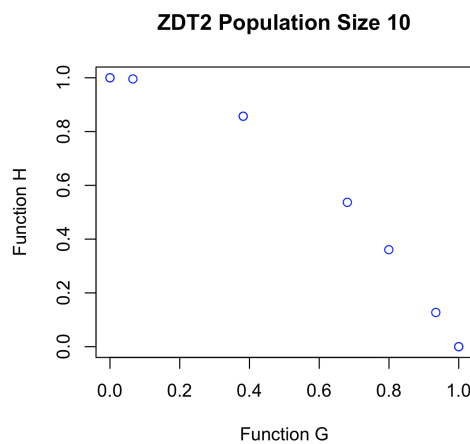
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The University of Adelaide

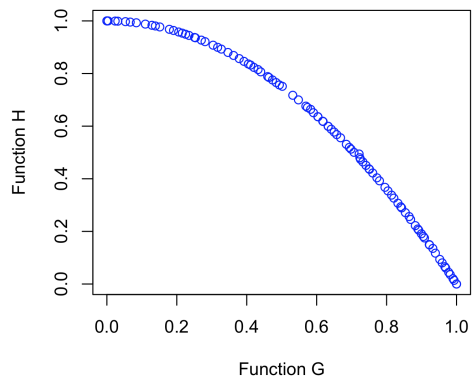
November 2, 2014

Exercise 1

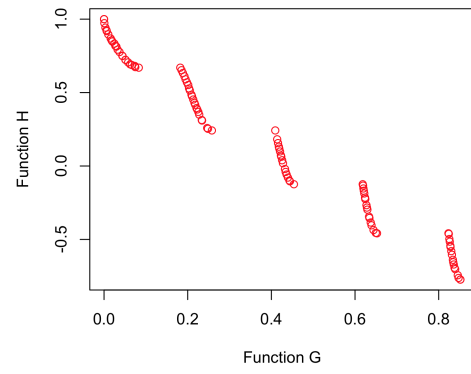
For this section of the assignment, we were required to visualise the datasets ZDT2 and ZDT3 for population sizes 10, 100 and 1000. These visualisations can be found below, with the ZDT2 dataset on the left in blue, and the ZDT3 dataset on the right in red. Unfortunately, neither dataset provides any insight into what the functions are, and only describe them as Function G and Function H. This makes it hard to comment on the accuracy of these results, however as the population size increases, the shape of the results becomes more defined. With a population size of 10, the ZDT2 graph appears to be a downwards curve, which is reflected in the larger graph sizes. However, the ZDT3 graph on a population size of 10 provides no real insight into the trend of the results, but as the population size increases, the trend becomes much clearer. It is possible to compare the ZDT3 population size 10 graph to the larger population sized graphs and see that it does indeed follow the same trend.



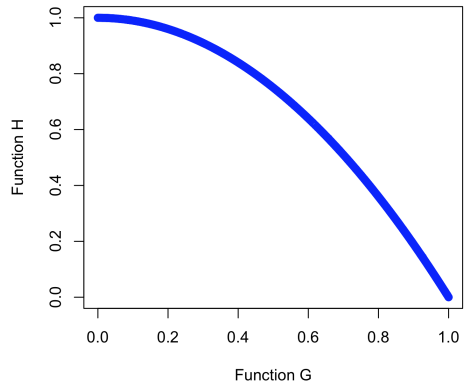
ZDT2 Population Size 100



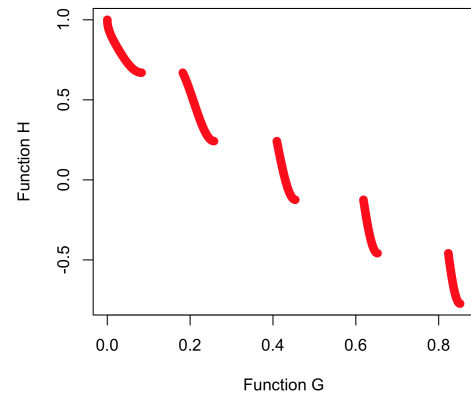
ZDT3 Population Size 100



ZDT2 Population Size 1000



ZDT3 Population Size 1000



Exercises 2 & 3

New Solution Type:

- jmetal/encodings/solutionType/IndividualSolutionType.java
- jmetal/encodings/variable/Individual.java
- jmetal/encodings/variable/Knapsack.java

Operators:

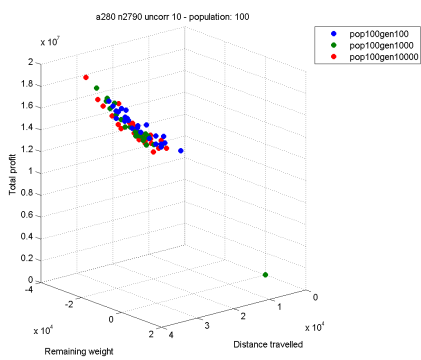
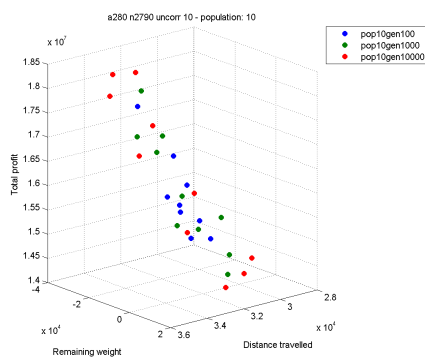
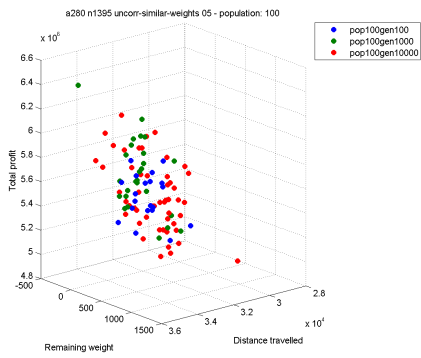
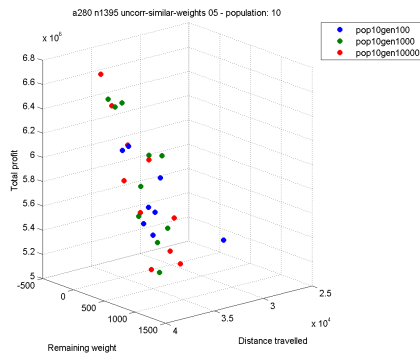
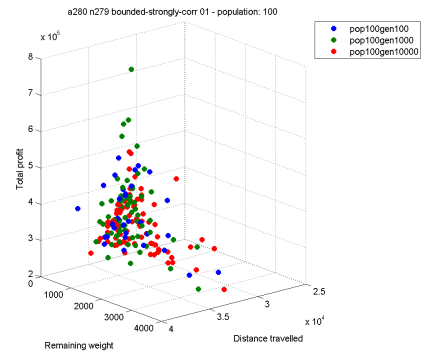
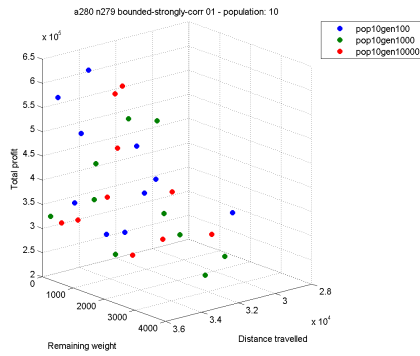
- jmetal/operators/crossover/ObsessivePackingv2.java
- jmetal/operators/mutation/TTPInversion.java
- jmetal/operators/selection/TTPElitism.java

Problem:

- jmetal/problems/TTP/*.java

You may find it useful to compile the code using the *compile.sh* script. You can then can run the code via the normal methods.

Exercise 4



Exercise 5

All data sets were run with population sizes 10 and 100. Anything larger than this would have yielded run-times in-excess of 24 hours, or generations deemed too low. Each data set had 10 and 100 generations performed for each population. The smaller of the two data sets were also run with 1000 generations, with the choice to limit the largest set purely based on run-time.

These populations and generations were chosen as they best fit suitable run-times and allow for adequate data retrieval.

The results for assignment two have not been overlaid onto the below graphs, as it does make sense to do so. Our justification for this is assignment two was a single objective problem, yielding great results which are not comparable to the results obtained for the multiobjective version of this problem. The primary comparison of profit in this assignment has been a minimisation problem where in assignment two it was a maximisation problem. An addition to this assignment would yield an extra dimension to the graph.

