

1. Consider the following set of points in the square (0,0) to (1,1) in file exercises-05_points.csv:

Use the k-median, k-center and k-cover models to answer the following questions.

Hint: start analysing files kcenter_XY.run, kmedian_XY.run, and related models in dddm support page.

- (a) Determine the average and maximum distance from a customer to the facility that served them.
- (b) Determine the time required for finding a solution by each model.
- (c) Determine the maximum distance from a customer to the facility that served them with binary search to and the k-cover model; verify that the optimum is the same as with k-center, and observe the time required for obtaining the solution.

Note 1: for reading a csv file in Python, check exercises-05_points.py

Note 2: for using a mathematical optimization model written in AMPL from a Python program, check kcover_binsearch.py