Institute of Applied Mathematics
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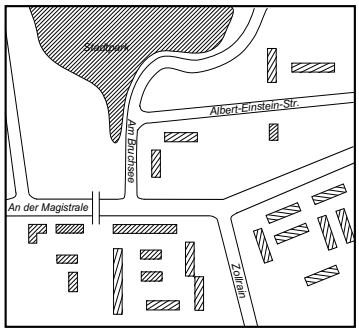
Location Analysis
WS 2007/2008
Homework 5

To be discussed in the tutorial on January 10, 2008.

18. The city council of Halle, Germany, plans to build a playground in a densly populated residential area of the city. Taking into account 18 appartment buildings in the respective area, the playground should be centrally located such that the maximum Euclidean distance from any of the blocks to the playground is minimized.



The coordinates of the entrances of the appartment blocks are specified in the following table:

Building number	Coordinates
1	$(1.5, 5)^\top$
2	$(2.5, 4)^\top$
3	$(3, 5)^\top$
4	$(3, 3)^\top$
5	$(5, 3)^\top$
6	$(5.5, 5.5)^\top$
7	$(6, 4)^\top$
8	$(6, 3.5)^\top$
9	$(6, 3)^\top$
10	$(6.5, 4.5)^\top$
11	$(7, 3.5)^\top$
12	$(10, 4.5)^\top$
13	$(10.5, 6)^\top$
14	$(11.5, 5.5)^\top$
15	$(5.5, 8.5)^\top$
16	$(6.5, 9)^\top$
17	$(9.5, 12.5)^\top$
18	$(11, 12)^\top$

Find the optimal center location for the playground using the Elzinga-Hearn Algorithm.

19. Find a mathematical programming formulation for the weighted multi-facility center problem with Euclidean distances $m/P/\bullet/l_2/\max$ and formulate the Karush-Kuhn-Tucker (KKT-) optimality conditions for this problem.