Standort-Optimierung

Handout 5

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Bergische Universität Wuppertal
Fachbereich C – Angewandte Mathematik / Optimierung und Approximation
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Algorithm 5.6.: Algorithm for $1/P/\bullet/l_\infty/\max$

Input: Existing facilities $a_1, \dots, a_n \in \mathbb{R}^2$; positive weights w_j, $j = 1, \dots, n$.

Step 1: Determine $z^* := \max\{|z_{jl}^k| \,:\, j, l \in \{1, \dots, n\}, j < l; k \in \{1, 2\}\}$, where

$$z_{jl}^k := \frac{w_j w_l}{w_j + w_l}(a_{jk} - a_{lk}), \quad j, l \in \{1, \dots, n\},\ j < l;\ k \in \{1, 2\}.$$

Step 2: Set $\mathcal{X}^* := [A_1^-(z^*), A_1^+(z^*)] \times [A_2^-(z^*), A_2^+(z^*)]$, where for $k = 1, 2$

$$A_k^+(z) := \min_{j=1,\dots,n} A_{jk}^+(z), \qquad A_{jk}^+(z) := a_{jk} + \tfrac{1}{w_j} z, \quad j = 1, \dots, n$$
$$A_k^-(z) := \max_{j=1,\dots,n} A_{jk}^-(z), \qquad A_{jk}^-(z) := a_{jk} - \tfrac{1}{w_j} z, \quad j = 1, \dots, n$$

Output: Set of optimal solutions $\mathcal{X}^*$ of $1/P/\bullet/l_\infty/\max$,
optimal objective value z^*.