Mathematical Model

Parameters

- N: Number of different illuminations (constant)

- M: Number of lamp powers (constant)

- $Coefficients_{ij}$: Coefficients relating lamp powers to illumination, where $i \in \{1, \ldots, N\}$ and $j \in \{1, \ldots, M\}$

- $DesiredIlluminations_i$: Desired level of illuminations for $i \in \{1, \ldots, N\}$

Decision Variables

- P_j: Power of lamp j for $j \in \{1, \ldots, M\}$

- E_i: Absolute error for illumination i for $i \in \{1, \ldots, N\}$

Objective

Minimize the absolute error between the actual illumination levels and the desired illumination levels:

$$\min \sum_{i=1}^{N} E_i$$

Constraints

$$\sum_{j=1}^{M} Coefficients_{ij} \cdot P_j - DesiredIlluminations_i \leq E_i, \quad \forall i \in \{1, \ldots, N\} \tag{1}$$

$$DesiredIlluminations_i - \sum_{j=1}^{M} Coefficients_{ij} \cdot P_j \leq E_i, \quad \forall i \in \{1, \ldots, N\} \tag{2}$$

$$P_j \geq 0, \quad \forall j \in \{1, \ldots, M\} \tag{3}$$