Mathematical Model for Finding the Chebychev Center

Objective

Maximize the radius r of the ball centered at the Chebychev center that lies entirely within the set P.

$$\text{Maximize } r$$

Constraints

1. The radii of balls are non-negative: (1)

$$r \geq 0 \tag{2}$$

2. The ball must be completely within the set P, which is defined by the constraints $Ax \leq b$: (3)

$$Ax + r\|A_i\|_2 \leq b_i, \quad \forall i = 1, 2, \ldots, M \tag{4}$$

Parameters

- M: The number of inequalities defining the set P.
- N: The ambient space dimension of the set P.
- $A \in R^{M \times N}$: The coefficients of the linear inequalities defining the set P.
- $b \in R^M$: The right-hand side of the inequalities defining the set P.