

A MINLP with Trigonometric Functions

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1 Goal

The goal of this document is to formally state the optimization problem which is solved in the example named as *MINLP-Trigonometric-Functions*.

2 Problem Formulation

For a given value $\theta > 0$ and $u \in \mathbb{R}^n$, the following optimization problem is solved:

$$\left\{ \begin{array}{ll} \min_{x,y} & \sum_{i=1}^n (\theta + u_i) (\sin(x_i) \cos(x_i) x_i^2) + \sum_{i=1}^n \cos(y_i^2) \sin(y_i) \\ \text{s.t.} & x_i x_1 \leq 1, \quad \forall i \\ & \sum_{i=1}^n x_i^2 \leq 10 \\ & \sum_{i=1}^n x_i^3 \leq \sum_{i=1}^n \sin(x_i) \cos(x_i) \\ & \sum_{i,j=1}^n x_i y_j \leq 1 \\ & x_i \in \mathbb{R}, \quad \forall i \\ & y_i \in \{0, 1\}, \quad \forall i \end{array} \right. \quad (1)$$