MPS 文件数学模型提取

完整版

MPS Extractor

2025 年 7 月 8 日

目录

1 模型概览

文件名: `gr4x6.mps`
模型名: name
变量总数: 48
约束总数: 34
优化方向: Minimize

2 目标函数

目标函数摘要:

$$\min \quad Z = \sum_i c_i Y_i + \sum_j d_j X_j \tag{1}$$

Y 变量: 24 个，系数范围 $[10, 20]$
X 变量: 24 个，系数范围 $[0.59, 2.83]$

完整目标函数:

$$\min \quad Z = 15Y_{22} + 11Y_0 + 16Y_1 \tag{2}$$
$$+ 18Y_2 + 17Y_3 + 10Y_4 \tag{3}$$
$$+ 20Y_5 + 14Y_6 + 17Y_7 \tag{4}$$
$$+ 17Y_8 + 13Y_9 + 15Y_{10} \tag{5}$$
$$+ 13Y_{11} + 12Y_{12} + 13Y_{13} \tag{6}$$
$$+ 20Y_{14} + 17Y_{15} + 13Y_{16} \tag{7}$$
$$+ 15Y_{17} + 16Y_{18} + 19Y_{19} \tag{8}$$
$$+ 15Y_{20} + 11Y_{21} + 12Y_{23} \tag{9}$$
$$+ 0.69X_0 + 0.64X_1 + 0.71X_2 \tag{10}$$
$$+ 0.79X_3 + 1.7X_4 + 2.83X_5 \tag{11}$$
$$+ 1.01X_6 + 0.75X_7 + 0.88X_8 \tag{12}$$
$$+ 0.59X_9 + 1.5X_{10} + 2.63X_{11} \tag{13}$$
$$+ 1.05X_{12} + 1.06X_{13} + 1.08X_{14} \tag{14}$$
$$+ 0.64X_{15} + 1.22X_{16} + 2.37X_{17} \tag{15}$$
$$+ 1.94X_{18} + 1.5X_{19} + 1.56X_{20} \tag{16}$$
$$+ 1.22X_{21} + 1.98X_{22} + 1.98X_{23}$$

3 约束条件

3.1 等式约束 (10 个)

$$X_0 + X_1 + X_2 + X_3 + X_4 + X_5 = +45 \qquad \text{(A0)} \tag{17}$$
$$X_6 + X_7 + X_8 + X_9 + X_{10} + X_{11} = +35 \qquad \text{(A1)} \tag{18}$$
$$X_{12} + X_{13} + X_{14} + X_{15} + X_{16} + X_{17} = +20 \qquad \text{(A2)} \tag{19}$$
$$X_{18} + X_{19} + X_{20} + X_{21} + X_{22} + X_{23} = +15 \qquad \text{(A3)} \tag{20}$$

$$X_0 + X_6 + X_{12} + X_{18} = +35 \qquad \text{(B0)} \qquad (21)$$
$$X_1 + X_7 + X_{13} + X_{19} = +30 \qquad \text{(B1)} \qquad (22)$$
$$X_2 + X_8 + X_{14} + X_{20} = +25 \qquad \text{(B2)} \qquad (23)$$
$$X_3 + X_9 + X_{15} + X_{21} = +15 \qquad \text{(B3)} \qquad (24)$$
$$X_4 + X_{10} + X_{16} + X_{22} = +5 \qquad \text{(B4)} \qquad (25)$$
$$X_5 + X_{11} + X_{17} + X_{23} = +5 \qquad \text{(B5)} \qquad (26)$$
$$(27)$$

3.2 不等式约束 (24 个)

$$X_0 - 35Y_0 \leq +0 \qquad \text{(G0)} \qquad (28)$$
$$X_1 - 30Y_1 \leq +0 \qquad \text{(G1)} \qquad (29)$$
$$X_2 - 25Y_2 \leq +0 \qquad \text{(G2)} \qquad (30)$$
$$X_3 - 15Y_3 \leq +0 \qquad \text{(G3)} \qquad (31)$$
$$X_4 - 5Y_4 \leq +0 \qquad \text{(G4)} \qquad (32)$$
$$X_5 - 5Y_5 \leq +0 \qquad \text{(G5)} \qquad (33)$$
$$X_6 - 35Y_6 \leq +0 \qquad \text{(G6)} \qquad (34)$$
$$X_7 - 30Y_7 \leq +0 \qquad \text{(G7)} \qquad (35)$$
$$X_8 - 25Y_8 \leq +0 \qquad \text{(G8)} \qquad (36)$$
$$X_9 - 15Y_9 \leq +0 \qquad \text{(G9)} \qquad (37)$$
$$X_{10} - 5Y_{10} \leq +0 \qquad \text{(G10)} \qquad (38)$$
$$X_{11} - 5Y_{11} \leq +0 \qquad \text{(G11)} \qquad (39)$$
$$X_{12} - 20Y_{12} \leq +0 \qquad \text{(G12)} \qquad (40)$$
$$X_{13} - 20Y_{13} \leq +0 \qquad \text{(G13)} \qquad (41)$$
$$X_{14} - 20Y_{14} \leq +0 \qquad \text{(G14)} \qquad (42)$$
$$X_{15} - 15Y_{15} \leq +0 \qquad \text{(G15)} \qquad (43)$$
$$X_{16} - 5Y_{16} \leq +0 \qquad \text{(G16)} \qquad (44)$$
$$X_{17} - 5Y_{17} \leq +0 \qquad \text{(G17)} \qquad (45)$$
$$X_{18} - 15Y_{18} \leq +0 \qquad \text{(G18)} \qquad (46)$$
$$X_{19} - 15Y_{19} \leq +0 \qquad \text{(G19)} \qquad (47)$$
$$X_{20} - 15Y_{20} \leq +0 \qquad \text{(G20)} \qquad (48)$$
$$X_{21} - 15Y_{21} \leq +0 \qquad \text{(G21)} \qquad (49)$$
$$X_{22} - 5Y_{22} \leq +0 \qquad \text{(G22)} \qquad (50)$$
$$X_{23} - 5Y_{23} \leq +0 \qquad \text{(G23)} \qquad (51)$$
$$(52)$$

4 变量定义

4.1 二元变量 (24 个)

$$Y_i \in \{0, 1\}, \quad i \in \{0, 1, 2, \ldots, 23\} \qquad (53)$$

所有二元变量:

$Y_{22}, Y_0, Y_1, Y_2, Y_3, Y_4, Y_5, Y_6, Y_7, Y_8,$

$Y_9, Y_{10}, Y_{11}, Y_{12}, Y_{13}, Y_{14}, Y_{15}, Y_{16}, Y_{17}, Y_{18},$

$Y_{19}, Y_{20}, Y_{21}, Y_{23}$

4.2 连续变量 (24 个)

所有连续变量均为非负实数:

$$X_j \geq 0, \quad j \in \{0, 1, 2, \ldots, 23\} \tag{54}$$

连续变量说明: 模型包含 24 个连续决策变量，所有变量的取值范围均为非负实数域。