# 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:** `ran10x10c.mps`
**模型名:** RANDR38
**变量总数:** 200
**约束总数:** 120
**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: 100 个，系数范围 [800, 1098]
X 变量: 100 个，系数范围 [1, 9]

**完整目标函数:**

$$\begin{aligned}
\min \quad Z = {} & 822Y_{98} + 946Y_0 + 942Y_1 && (2)\\
& + 959Y_2 + 1004Y_3 + 953Y_4 && (3)\\
& + 993Y_5 + 890Y_6 + 962Y_7 && (4)\\
& + 987Y_8 + 1002Y_9 + 876Y_{10} && (5)\\
& + 1036Y_{11} + 959Y_{12} + 861Y_{13} && (6)\\
& + 1096Y_{14} + 1049Y_{15} + 1035Y_{16} && (7)\\
& + 1021Y_{17} + 960Y_{18} + 870Y_{19} && (8)\\
& + 800Y_{20} + 823Y_{21} + 1058Y_{22} && (9)\\
& + 831Y_{23} + 1074Y_{24} + 863Y_{25} && (10)\\
& + 874Y_{26} + 988Y_{27} + 921Y_{28} && (11)\\
& + 852Y_{29} + 999Y_{30} + 1023Y_{31} && (12)\\
& + 1067Y_{32} + 891Y_{33} + 1098Y_{34} && (13)\\
& + 803Y_{35} + 879Y_{36} + 1037Y_{37} && (14)\\
& + 891Y_{38} + 1067Y_{39} + 1028Y_{40} && (15)\\
& + 955Y_{41} + 953Y_{42} + 969Y_{43} && (16)\\
& + 931Y_{44} + 1041Y_{45} + 1047Y_{46} && (17)\\
& + 1087Y_{47} + 981Y_{48} + 938Y_{49} && (18)\\
& + 941Y_{50} + 867Y_{51} + 1098Y_{52} && (19)\\
& + 1059Y_{53} + 1035Y_{54} + 1093Y_{55} && (20)\\
& + 1016Y_{56} + 963Y_{57} + 907Y_{58} && (21)\\
& + 909Y_{59} + 1028Y_{60} + 1019Y_{61} && (22)\\
& + 1012Y_{62} + 991Y_{63} + 1080Y_{64} && (23)\\
& + 970Y_{65} + 1083Y_{66} + 1031Y_{67} && (24)\\
& + 869Y_{68} + 938Y_{69} + 866Y_{70} && (25)
\end{aligned}$$

$$+ 1086Y_{71} + 937Y_{72} + 1064Y_{73} \tag{26}$$

$$+ 1049Y_{74} + 804Y_{75} + 955Y_{76} \tag{27}$$

$$+ 856Y_{77} + 826Y_{78} + 1083Y_{79} \tag{28}$$

$$+ 1075Y_{80} + 1040Y_{81} + 1011Y_{82} \tag{29}$$

$$+ 814Y_{83} + 1033Y_{84} + 832Y_{85} \tag{30}$$

$$+ 866Y_{86} + 994Y_{87} + 951Y_{88} \tag{31}$$

$$+ 830Y_{89} + 1056Y_{90} + 900Y_{91} \tag{32}$$

$$+ 977Y_{92} + 1004Y_{93} + 1079Y_{94} \tag{33}$$

$$+ 983Y_{95} + 1097Y_{96} + 1037Y_{97} \tag{34}$$

$$+ 931Y_{99} + 7X_0 + 9X_1 \tag{35}$$

$$+ 1X_2 + 3X_3 + 7X_4 \tag{36}$$

$$+ 9X_5 + 5X_6 + 3X_7 \tag{37}$$

$$+ 4X_8 + 5X_9 + 4X_{10} \tag{38}$$

$$+ 4X_{11} + 1X_{12} + 5X_{13} \tag{39}$$

$$+ 2X_{14} + 5X_{15} + 4X_{16} \tag{40}$$

$$+ 5X_{17} + 1X_{18} + 5X_{19} \tag{41}$$

$$+ 1X_{20} + 4X_{21} + 1X_{22} \tag{42}$$

$$+ 7X_{23} + 5X_{24} + 4X_{25} \tag{43}$$

$$+ 8X_{26} + 6X_{27} + 1X_{28} \tag{44}$$

$$+ 8X_{29} + 1X_{30} + 4X_{31} \tag{45}$$

$$+ 7X_{32} + 6X_{33} + 1X_{34} \tag{46}$$

$$+ 2X_{35} + 5X_{36} + 4X_{37} \tag{47}$$

$$+ 6X_{38} + 8X_{39} + 9X_{40} \tag{48}$$

$$+ 8X_{41} + 7X_{42} + 5X_{43} \tag{49}$$

$$+ 5X_{44} + 2X_{45} + 9X_{46} \tag{50}$$

$$+ 6X_{47} + 2X_{48} + 2X_{49} \tag{51}$$

$$+ 9X_{50} + 6X_{51} + 1X_{52} \tag{52}$$

$$+ 1X_{53} + 3X_{54} + 4X_{55} \tag{53}$$

$$+ 3X_{56} + 2X_{57} + 6X_{58} \tag{54}$$

$$+ 5X_{59} + 9X_{60} + 1X_{61} \tag{55}$$

$$+ 9X_{62} + 5X_{63} + 2X_{64} \tag{56}$$

$$+ 5X_{65} + 8X_{66} + 6X_{67} \tag{57}$$

$$+ 6X_{68} + 2X_{69} + 7X_{70} \tag{58}$$

$$+ 7X_{71} + 2X_{72} + 9X_{73} \tag{59}$$

$$+ 6X_{74} + 3X_{75} + 7X_{76} \tag{60}$$

$$+ 2X_{77} + 5X_{78} + 8X_{79} \tag{61}$$

$$+ 4X_{80} + 1X_{81} + 9X_{82} \tag{62}$$

$$+ 7X_{83} + 7X_{84} + 8X_{85} \tag{63}$$

$$+ 7X_{86} + 7X_{87} + 6X_{88} \tag{64}$$

$$+ 7X_{89} + 4X_{90} + 1X_{91} \tag{65}$$

$$+ 8X_{92} + 3X_{93} + 1X_{94} \tag{66}$$

$$+ 4X_{95} + 2X_{96} + 4X_{97} \tag{67}$$

$$+ 2X_{98} + 6X_{99}$$

# 3 约束条件

## 3.1 等式约束 (20 个)

$$X_0 + X_1 + X_2 + X_3 + X_4 + X_5 \tag{68}$$

$$+ X_6 + X_7 + X_8 + X_9 = +3 \quad \text{(A0)} \tag{69}$$

$$X_{10} + X_{11} + X_{12} + X_{13} + X_{14} + X_{15} \tag{70}$$

$$+ X_{16} + X_{17} + X_{18} + X_{19} = +9 \quad \text{(A1)} \tag{71}$$

$$X_{20} + X_{21} + X_{22} + X_{23} + X_{24} + X_{25} \tag{72}$$

$$+ X_{26} + X_{27} + X_{28} + X_{29} = +16 \quad \text{(A2)} \tag{73}$$

$$X_{30} + X_{31} + X_{32} + X_{33} + X_{34} + X_{35} \tag{74}$$

$$+ X_{36} + X_{37} + X_{38} + X_{39} = +11 \quad \text{(A3)} \tag{75}$$

$$X_{40} + X_{41} + X_{42} + X_{43} + X_{44} + X_{45} \tag{76}$$

$$+ X_{46} + X_{47} + X_{48} + X_{49} = +10 \quad \text{(A4)} \tag{77}$$

$$X_{50} + X_{51} + X_{52} + X_{53} + X_{54} + X_{55} \tag{78}$$

$$+ X_{56} + X_{57} + X_{58} + X_{59} = +1 \quad \text{(A5)} \tag{79}$$

$$X_{60} + X_{61} + X_{62} + X_{63} + X_{64} + X_{65} \tag{80}$$

$$+ X_{66} + X_{67} + X_{68} + X_{69} = +15 \quad \text{(A6)} \tag{81}$$

$$X_{70} + X_{71} + X_{72} + X_{73} + X_{74} + X_{75} \tag{82}$$

$$+ X_{76} + X_{77} + X_{78} + X_{79} = +7 \quad \text{(A7)} \tag{83}$$

$$X_{80} + X_{81} + X_{82} + X_{83} + X_{84} + X_{85} \tag{84}$$

$$+ X_{86} + X_{87} + X_{88} + X_{89} = +11 \quad \text{(A8)} \tag{85}$$

$$X_{90} + X_{91} + X_{92} + X_{93} + X_{94} + X_{95} \tag{86}$$

$$+ X_{96} + X_{97} + X_{98} + X_{99} = +17 \quad \text{(A9)} \tag{87}$$

$$X_0 + X_{10} + X_{20} + X_{30} + X_{40} + X_{50} \tag{88}$$

$$+ X_{60} + X_{70} + X_{80} + X_{90} = +2 \quad \text{(B0)} \tag{89}$$

$$X_1 + X_{11} + X_{21} + X_{31} + X_{41} + X_{51} \tag{90}$$

$$+ X_{61} + X_{71} + X_{81} + X_{91} = +17 \quad \text{(B1)} \tag{91}$$

$$X_2 + X_{12} + X_{22} + X_{32} + X_{42} + X_{52} \tag{92}$$

$$+ X_{62} + X_{72} + X_{82} + X_{92} = +2 \quad \text{(B2)} \tag{93}$$

$$X_3 + X_{13} + X_{23} + X_{33} + X_{43} + X_{53} \tag{94}$$

$$+ X_{63} + X_{73} + X_{83} + X_{93} = +20 \quad \text{(B3)} \tag{95}$$

$$X_4 + X_{14} + X_{24} + X_{34} + X_{44} + X_{54} \tag{96}$$

$$+ X_{64} + X_{74} + X_{84} + X_{94} = +6 \quad \text{(B4)} \tag{97}$$

$$X_5 + X_{15} + X_{25} + X_{35} + X_{45} + X_{55} \tag{98}$$

$$+ X_{65} + X_{75} + X_{85} + X_{95} = +4 \quad \text{(B5)} \tag{99}$$

$$X_6 + X_{16} + X_{26} + X_{36} + X_{46} + X_{56} \tag{100}$$

$$+ X_{66} + X_{76} + X_{86} + X_{96} = +11 \quad \text{(B6)} \tag{101}$$

$$X_7 + X_{17} + X_{27} + X_{37} + X_{47} + X_{57} \tag{102}$$

$$+ X_{67} + X_{77} + X_{87} + X_{97} = +12 \quad \text{(B7)} \tag{103}$$

$$X_8 + X_{18} + X_{28} + X_{38} + X_{48} + X_{58} \tag{104}$$

$$+ X_{68} + X_{78} + X_{88} + X_{98} = +24 \quad \text{(B8)} \tag{105}$$

$$X_9 + X_{19} + X_{29} + X_{39} + X_{49} + X_{59} \tag{106}$$

$$+ X_{69} + X_{79} + X_{89} + X_{99} = +2 \quad \text{(B9)} \tag{107}$$

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## 3.2 不等式约束 (100 个)

$$X_0 - 2Y_0 \leq +0 \quad \text{(G0)} \tag{109}$$

$$X_1 - 3Y_1 \leq +0 \quad \text{(G1)} \tag{110}$$

$$X_2 - 2Y_2 \leq +0 \quad \text{(G2)} \tag{111}$$

$$X_3 - 3Y_3 \leq +0 \quad \text{(G3)} \tag{112}$$

$$X_4 - 3Y_4 \leq +0 \quad \text{(G4)} \tag{113}$$

$$X_5 - 3Y_5 \leq +0 \quad \text{(G5)} \tag{114}$$

$$X_6 - 3Y_6 \leq +0 \quad \text{(G6)} \tag{115}$$

$$X_7 - 3Y_7 \leq +0 \quad \text{(G7)} \tag{116}$$

$$X_8 - 3Y_8 \leq +0 \quad \text{(G8)} \tag{117}$$

$$X_9 - 2Y_9 \leq +0 \quad \text{(G9)} \tag{118}$$

$$X_{10} - 2Y_{10} \leq +0 \quad \text{(G10)} \tag{119}$$

$$X_{11} - 9Y_{11} \leq +0 \quad \text{(G11)} \tag{120}$$

$$X_{12} - 2Y_{12} \leq +0 \quad \text{(G12)} \tag{121}$$

$$X_{13} - 9Y_{13} \leq +0 \quad \text{(G13)} \tag{122}$$

$$X_{14} - 6Y_{14} \leq +0 \quad \text{(G14)} \tag{123}$$

$$X_{15} - 4Y_{15} \leq +0 \quad \text{(G15)} \tag{124}$$

$$X_{16} - 9Y_{16} \leq +0 \quad \text{(G16)} \tag{125}$$

$$X_{17} - 9Y_{17} \leq +0 \quad \text{(G17)} \tag{126}$$

$$X_{18} - 9Y_{18} \leq +0 \quad \text{(G18)} \tag{127}$$

$$X_{19} - 2Y_{19} \leq +0 \quad \text{(G19)} \tag{128}$$

$$X_{20} - 2Y_{20} \leq +0 \quad \text{(G20)} \tag{129}$$

$$X_{21} - 16Y_{21} \leq +0 \quad \text{(G21)} \tag{130}$$

$$X_{22} - 2Y_{22} \leq +0 \quad \text{(G22)} \tag{131}$$

$$X_{23} - 16Y_{23} \leq +0 \quad \text{(G23)} \tag{132}$$

$$X_{24} - 6Y_{24} \leq +0 \quad \text{(G24)} \tag{133}$$

$$X_{25} - 4Y_{25} \leq +0 \quad \text{(G25)} \tag{134}$$

$$X_{26} - 11Y_{26} \leq +0 \quad \text{(G26)} \tag{135}$$

$$X_{27} - 12Y_{27} \leq +0 \quad \text{(G27)} \tag{136}$$

$$X_{28} - 16Y_{28} \leq +0 \quad \text{(G28)} \tag{137}$$

$$X_{29} - 2Y_{29} \leq +0 \quad \text{(G29)} \tag{138}$$

$$X_{30} - 2Y_{30} \leq +0 \quad \text{(G30)} \tag{139}$$

$$X_{31} - 11Y_{31} \leq +0 \quad \text{(G31)} \quad (140)$$

$$X_{32} - 2Y_{32} \leq +0 \quad \text{(G32)} \quad (141)$$

$$X_{33} - 11Y_{33} \leq +0 \quad \text{(G33)} \quad (142)$$

$$X_{34} - 6Y_{34} \leq +0 \quad \text{(G34)} \quad (143)$$

$$X_{35} - 4Y_{35} \leq +0 \quad \text{(G35)} \quad (144)$$

$$X_{36} - 11Y_{36} \leq +0 \quad \text{(G36)} \quad (145)$$

$$X_{37} - 11Y_{37} \leq +0 \quad \text{(G37)} \quad (146)$$

$$X_{38} - 11Y_{38} \leq +0 \quad \text{(G38)} \quad (147)$$

$$X_{39} - 2Y_{39} \leq +0 \quad \text{(G39)} \quad (148)$$

$$X_{40} - 2Y_{40} \leq +0 \quad \text{(G40)} \quad (149)$$

$$X_{41} - 10Y_{41} \leq +0 \quad \text{(G41)} \quad (150)$$

$$X_{42} - 2Y_{42} \leq +0 \quad \text{(G42)} \quad (151)$$

$$X_{43} - 10Y_{43} \leq +0 \quad \text{(G43)} \quad (152)$$

$$X_{44} - 6Y_{44} \leq +0 \quad \text{(G44)} \quad (153)$$

$$X_{45} - 4Y_{45} \leq +0 \quad \text{(G45)} \quad (154)$$

$$X_{46} - 10Y_{46} \leq +0 \quad \text{(G46)} \quad (155)$$

$$X_{47} - 10Y_{47} \leq +0 \quad \text{(G47)} \quad (156)$$

$$X_{48} - 10Y_{48} \leq +0 \quad \text{(G48)} \quad (157)$$

$$X_{49} - 2Y_{49} \leq +0 \quad \text{(G49)} \quad (158)$$

$$X_{50} - Y_{50} \leq +0 \quad \text{(G50)} \quad (159)$$

$$X_{51} - Y_{51} \leq +0 \quad \text{(G51)} \quad (160)$$

$$X_{52} - Y_{52} \leq +0 \quad \text{(G52)} \quad (161)$$

$$X_{53} - Y_{53} \leq +0 \quad \text{(G53)} \quad (162)$$

$$X_{54} - Y_{54} \leq +0 \quad \text{(G54)} \quad (163)$$

$$X_{55} - Y_{55} \leq +0 \quad \text{(G55)} \quad (164)$$

$$X_{56} - Y_{56} \leq +0 \quad \text{(G56)} \quad (165)$$

$$X_{57} - Y_{57} \leq +0 \quad \text{(G57)} \quad (166)$$

$$X_{58} - Y_{58} \leq +0 \quad \text{(G58)} \quad (167)$$

$$X_{59} - Y_{59} \leq +0 \quad \text{(G59)} \quad (168)$$

$$X_{60} - 2Y_{60} \leq +0 \quad \text{(G60)} \quad (169)$$

$$X_{61} - 15Y_{61} \leq +0 \quad \text{(G61)} \quad (170)$$

$$X_{62} - 2Y_{62} \leq +0 \quad \text{(G62)} \quad (171)$$

$$X_{63} - 15Y_{63} \leq +0 \quad \text{(G63)} \quad (172)$$

$$X_{64} - 6Y_{64} \leq +0 \quad \text{(G64)} \quad (173)$$

$$X_{65} - 4Y_{65} \leq +0 \quad \text{(G65)} \quad (174)$$

$$X_{66} - 11Y_{66} \leq +0 \quad \text{(G66)} \quad (175)$$

$$X_{67} - 12Y_{67} \leq +0 \quad \text{(G67)} \quad (176)$$

$$X_{68} - 15Y_{68} \leq +0 \quad \text{(G68)} \quad (177)$$

$$X_{69} - 2Y_{69} \leq +0 \quad \text{(G69)} \quad (178)$$

$$X_{70} - 2Y_{70} \leq +0 \quad \text{(G70)} \quad (179)$$

$$X_{71} - 7Y_{71} \leq +0 \quad \text{(G71)} \quad (180)$$

$$X_{72} - 2Y_{72} \leq +0 \quad \text{(G72)} \quad (181)$$

$$X_{73} - 7Y_{73} \leq +0 \quad \text{(G73)} \tag{182}$$
$$X_{74} - 6Y_{74} \leq +0 \quad \text{(G74)} \tag{183}$$
$$X_{75} - 4Y_{75} \leq +0 \quad \text{(G75)} \tag{184}$$
$$X_{76} - 7Y_{76} \leq +0 \quad \text{(G76)} \tag{185}$$
$$X_{77} - 7Y_{77} \leq +0 \quad \text{(G77)} \tag{186}$$
$$X_{78} - 7Y_{78} \leq +0 \quad \text{(G78)} \tag{187}$$
$$X_{79} - 2Y_{79} \leq +0 \quad \text{(G79)} \tag{188}$$
$$X_{80} - 2Y_{80} \leq +0 \quad \text{(G80)} \tag{189}$$
$$X_{81} - 11Y_{81} \leq +0 \quad \text{(G81)} \tag{190}$$
$$X_{82} - 2Y_{82} \leq +0 \quad \text{(G82)} \tag{191}$$
$$X_{83} - 11Y_{83} \leq +0 \quad \text{(G83)} \tag{192}$$
$$X_{84} - 6Y_{84} \leq +0 \quad \text{(G84)} \tag{193}$$
$$X_{85} - 4Y_{85} \leq +0 \quad \text{(G85)} \tag{194}$$
$$X_{86} - 11Y_{86} \leq +0 \quad \text{(G86)} \tag{195}$$
$$X_{87} - 11Y_{87} \leq +0 \quad \text{(G87)} \tag{196}$$
$$X_{88} - 11Y_{88} \leq +0 \quad \text{(G88)} \tag{197}$$
$$X_{89} - 2Y_{89} \leq +0 \quad \text{(G89)} \tag{198}$$
$$X_{90} - 2Y_{90} \leq +0 \quad \text{(G90)} \tag{199}$$
$$X_{91} - 17Y_{91} \leq +0 \quad \text{(G91)} \tag{200}$$
$$X_{92} - 2Y_{92} \leq +0 \quad \text{(G92)} \tag{201}$$
$$X_{93} - 17Y_{93} \leq +0 \quad \text{(G93)} \tag{202}$$
$$X_{94} - 6Y_{94} \leq +0 \quad \text{(G94)} \tag{203}$$
$$X_{95} - 4Y_{95} \leq +0 \quad \text{(G95)} \tag{204}$$
$$X_{96} - 11Y_{96} \leq +0 \quad \text{(G96)} \tag{205}$$
$$X_{97} - 12Y_{97} \leq +0 \quad \text{(G97)} \tag{206}$$
$$X_{98} - 17Y_{98} \leq +0 \quad \text{(G98)} \tag{207}$$
$$X_{99} - 2Y_{99} \leq +0 \quad \text{(G99)} \tag{208}$$
$$\tag{209}$$

# 4 变量定义

## 4.1 二元变量 (100 个)

$$Y_i \in \{0, 1\}, \quad i \in \{0, 1, 2, \ldots, 99\} \tag{210}$$

**二元变量示例** (显示前 50 个，共 100 个):

$Y_{98}$, $Y_0$, $Y_1$, $Y_2$, $Y_3$, $Y_4$, $Y_5$, $Y_6$, $Y_7$, $Y_8$,
$Y_9$, $Y_{10}$, $Y_{11}$, $Y_{12}$, $Y_{13}$, $Y_{14}$, $Y_{15}$, $Y_{16}$, $Y_{17}$, $Y_{18}$,
$Y_{19}$, $Y_{20}$, $Y_{21}$, $Y_{22}$, $Y_{23}$, $Y_{24}$, $Y_{25}$, $Y_{26}$, $Y_{27}$, $Y_{28}$,
$Y_{29}$, $Y_{30}$, $Y_{31}$, $Y_{32}$, $Y_{33}$, $Y_{34}$, $Y_{35}$, $Y_{36}$, $Y_{37}$, $Y_{38}$,
$Y_{39}$, $Y_{40}$, $Y_{41}$, $Y_{42}$, $Y_{43}$, $Y_{44}$, $Y_{45}$, $Y_{46}$, $Y_{47}$, $Y_{48}$

*... 还有 50 个二元变量*

## 4.2 连续变量 (100 个)

所有连续变量均为非负实数:

$$X_j \geq 0, \quad j \in \{0, 1, 2, \ldots, 99\} \tag{211}$$

**连续变量说明:** 模型包含 100 个连续决策变量，所有变量的取值范围均为非负实数域。