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: `ran16x16.mps`
模型名: RAN16X16
变量总数: 512
约束总数: 288
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: 256 个，系数范围 [67, 262]
X 变量: 256 个，系数范围 [1, 10]

完整目标函数:

$$\begin{aligned}
\min \quad Z = {} & 102Y_{254} + 149Y_0 + 221Y_1 && (2)\\
& + 69Y_2 + 112Y_3 + 201Y_4 && (3)\\
& + 179Y_5 + 209Y_6 + 183Y_7 && (4)\\
& + 133Y_8 + 249Y_9 + 79Y_{10} && (5)\\
& + 121Y_{11} + 101Y_{12} + 262Y_{13} && (6)\\
& + 163Y_{14} + 97Y_{15} + 139Y_{16} && (7)\\
& + 92Y_{17} + 179Y_{18} + 112Y_{19} && (8)\\
& + 136Y_{20} + 172Y_{21} + 183Y_{22} && (9)\\
& + 216Y_{23} + 193Y_{24} + 151Y_{25} && (10)\\
& + 235Y_{26} + 243Y_{27} + 206Y_{28} && (11)\\
& + 259Y_{29} + 193Y_{30} + 70Y_{31} && (12)\\
& + 240Y_{32} + 142Y_{33} + 86Y_{34} && (13)\\
& + 170Y_{35} + 162Y_{36} + 82Y_{37} && (14)\\
& + 106Y_{38} + 196Y_{39} + 124Y_{40} && (15)\\
& + 172Y_{41} + 195Y_{42} + 238Y_{43} && (16)\\
& + 250Y_{44} + 90Y_{45} + 140Y_{46} && (17)\\
& + 250Y_{47} + 72Y_{48} + 112Y_{49} && (18)\\
& + 68Y_{50} + 184Y_{51} + 95Y_{52} && (19)\\
& + 230Y_{53} + 221Y_{54} + 128Y_{55} && (20)\\
& + 130Y_{56} + 146Y_{57} + 212Y_{58} && (21)\\
& + 241Y_{59} + 75Y_{60} + 151Y_{61} && (22)\\
& + 176Y_{62} + 179Y_{63} + 109Y_{64} && (23)\\
& + 222Y_{65} + 72Y_{66} + 90Y_{67} && (24)\\
& + 117Y_{68} + 112Y_{69} + 74Y_{70} && (25)
\end{aligned}$$

$$+ 151Y_{71} + 101Y_{72} + 181Y_{73} \tag{26}$$

$$+ 196Y_{74} + 79Y_{75} + 117Y_{76} \tag{27}$$

$$+ 155Y_{77} + 193Y_{78} + 238Y_{79} \tag{28}$$

$$+ 206Y_{80} + 159Y_{81} + 241Y_{82} \tag{29}$$

$$+ 198Y_{83} + 149Y_{84} + 146Y_{85} \tag{30}$$

$$+ 214Y_{86} + 171Y_{87} + 207Y_{88} \tag{31}$$

$$+ 133Y_{89} + 75Y_{90} + 224Y_{91} \tag{32}$$

$$+ 127Y_{92} + 208Y_{93} + 249Y_{94} \tag{33}$$

$$+ 235Y_{95} + 118Y_{96} + 185Y_{97} \tag{34}$$

$$+ 251Y_{98} + 159Y_{99} + 119Y_{100} \tag{35}$$

$$+ 98Y_{101} + 252Y_{102} + 204Y_{103} \tag{36}$$

$$+ 137Y_{104} + 177Y_{105} + 208Y_{106} \tag{37}$$

$$+ 126Y_{107} + 167Y_{108} + 110Y_{109} \tag{38}$$

$$+ 163Y_{110} + 136Y_{111} + 105Y_{112} \tag{39}$$

$$+ 206Y_{113} + 101Y_{114} + 196Y_{115} \tag{40}$$

$$+ 121Y_{116} + 127Y_{117} + 174Y_{118} \tag{41}$$

$$+ 90Y_{119} + 216Y_{120} + 258Y_{121} \tag{42}$$

$$+ 119Y_{122} + 156Y_{123} + 212Y_{124} \tag{43}$$

$$+ 94Y_{125} + 69Y_{126} + 126Y_{127} \tag{44}$$

$$+ 211Y_{128} + 127Y_{129} + 154Y_{130} \tag{45}$$

$$+ 158Y_{131} + 76Y_{132} + 214Y_{133} \tag{46}$$

$$+ 256Y_{134} + 197Y_{135} + 221Y_{136} \tag{47}$$

$$+ 224Y_{137} + 255Y_{138} + 147Y_{139} \tag{48}$$

$$+ 144Y_{140} + 106Y_{141} + 219Y_{142} \tag{49}$$

$$+ 167Y_{143} + 198Y_{144} + 109Y_{145} \tag{50}$$

$$+ 69Y_{146} + 186Y_{147} + 69Y_{148} \tag{51}$$

$$+ 196Y_{149} + 159Y_{150} + 243Y_{151} \tag{52}$$

$$+ 148Y_{152} + 207Y_{153} + 176Y_{154} \tag{53}$$

$$+ 79Y_{155} + 214Y_{156} + 245Y_{157} \tag{54}$$

$$+ 215Y_{158} + 138Y_{159} + 237Y_{160} \tag{55}$$

$$+ 128Y_{161} + 213Y_{162} + 232Y_{163} \tag{56}$$

$$+ 225Y_{164} + 240Y_{165} + 202Y_{166} \tag{57}$$

$$+ 129Y_{167} + 221Y_{168} + 204Y_{169} \tag{58}$$

$$+ 225Y_{170} + 181Y_{171} + 183Y_{172} \tag{59}$$

$$+ 229Y_{173} + 109Y_{174} + 147Y_{175} \tag{60}$$

$$+ 251Y_{176} + 163Y_{177} + 175Y_{178} \tag{61}$$

$$+ 110Y_{179} + 88Y_{180} + 107Y_{181} \tag{62}$$

$$+ 253Y_{182} + 198Y_{183} + 104Y_{184} \tag{63}$$

$$+ 183Y_{185} + 141Y_{186} + 143Y_{187} \tag{64}$$

$$+ 111Y_{188} + 148Y_{189} + 185Y_{190} \tag{65}$$

$$+ 130Y_{191} + 188Y_{192} + 142Y_{193} \tag{66}$$

$$+ 99Y_{194} + 138Y_{195} + 248Y_{196} \tag{67}$$

$$+ 255Y_{197} + 89Y_{198} + 142Y_{199} \tag{68}$$

$$+ 235Y_{200} + 201Y_{201} + 188Y_{202} \tag{69}$$

$$+ 241Y_{203} + 241Y_{204} + 75Y_{205} \tag{70}$$

$$+ 189Y_{206} + 120Y_{207} + 109Y_{208} \tag{71}$$

$$+ 145Y_{209} + 198Y_{210} + 122Y_{211} \tag{72}$$

$$+ 249Y_{212} + 178Y_{213} + 230Y_{214} \tag{73}$$

$$+ 134Y_{215} + 92Y_{216} + 192Y_{217} \tag{74}$$

$$+ 177Y_{218} + 215Y_{219} + 239Y_{220} \tag{75}$$

$$+ 67Y_{221} + 242Y_{222} + 208Y_{223} \tag{76}$$

$$+ 142Y_{224} + 208Y_{225} + 147Y_{226} \tag{77}$$

$$+ 109Y_{227} + 167Y_{228} + 88Y_{229} \tag{78}$$

$$+ 251Y_{230} + 215Y_{231} + 130Y_{232} \tag{79}$$

$$+ 111Y_{233} + 144Y_{234} + 148Y_{235} \tag{80}$$

$$+ 102Y_{236} + 178Y_{237} + 166Y_{238} \tag{81}$$

$$+ 179Y_{239} + 164Y_{240} + 81Y_{241} \tag{82}$$

$$+ 188Y_{242} + 238Y_{243} + 105Y_{244} \tag{83}$$

$$+ 210Y_{245} + 128Y_{246} + 136Y_{247} \tag{84}$$

$$+ 258Y_{248} + 166Y_{249} + 124Y_{250} \tag{85}$$

$$+ 151Y_{251} + 134Y_{252} + 136Y_{253} \tag{86}$$

$$+ 111Y_{255} + 7X_0 + 3X_1 \tag{87}$$

$$+ 4X_2 + 10X_3 + 3X_4 \tag{88}$$

$$+ 8X_5 + 2X_6 + 9X_7 \tag{89}$$

$$+ 2X_8 + 2X_9 + 3X_{10} \tag{90}$$

$$+ 3X_{11} + 8X_{12} + 3X_{13} \tag{91}$$

$$+ 7X_{14} + 8X_{15} + 8X_{16} \tag{92}$$

$$+ 1X_{17} + 7X_{18} + 10X_{19} \tag{93}$$

$$+ 10X_{20} + 2X_{21} + 10X_{22} \tag{94}$$

$$+ 10X_{23} + 10X_{24} + 6X_{25} \tag{95}$$

$$+ 5X_{26} + 8X_{27} + 9X_{28} \tag{96}$$

$$+ 5X_{29} + 10X_{30} + 5X_{31} \tag{97}$$

$$+ 10X_{32} + 4X_{33} + 8X_{34} \tag{98}$$

$$+ 10X_{35} + 7X_{36} + 3X_{37} \tag{99}$$

$$+ 5X_{38} + 2X_{39} + 6X_{40} \tag{100}$$

$$+ 2X_{41} + 8X_{42} + 3X_{43} \tag{101}$$

$$+ 2X_{44} + 3X_{45} + 5X_{46} \tag{102}$$

$$+ 3X_{47} + 7X_{48} + 10X_{49} \tag{103}$$

$$+ 3X_{50} + 1X_{51} + 3X_{52} \tag{104}$$
$$+ 9X_{53} + 8X_{54} + 3X_{55} \tag{105}$$
$$+ 1X_{56} + 10X_{57} + 5X_{58} \tag{106}$$
$$+ 10X_{59} + 9X_{60} + 6X_{61} \tag{107}$$
$$+ 5X_{62} + 7X_{63} + 7X_{64} \tag{108}$$
$$+ 4X_{65} + 7X_{66} + 2X_{67} \tag{109}$$
$$+ 5X_{68} + 10X_{69} + 8X_{70} \tag{110}$$
$$+ 6X_{71} + 9X_{72} + 9X_{73} \tag{111}$$
$$+ 2X_{74} + 3X_{75} + 5X_{76} \tag{112}$$
$$+ 3X_{77} + 9X_{78} + 3X_{79} \tag{113}$$
$$+ 10X_{80} + 10X_{81} + 10X_{82} \tag{114}$$
$$+ 1X_{83} + 7X_{84} + 2X_{85} \tag{115}$$
$$+ 4X_{86} + 10X_{87} + 9X_{88} \tag{116}$$
$$+ 2X_{89} + 9X_{90} + 5X_{91} \tag{117}$$
$$+ 8X_{92} + 3X_{93} + 2X_{94} \tag{118}$$
$$+ 5X_{95} + 1X_{96} + 1X_{97} \tag{119}$$
$$+ 1X_{98} + 10X_{99} + 2X_{100} \tag{120}$$
$$+ 6X_{101} + 1X_{102} + 6X_{103} \tag{121}$$
$$+ 6X_{104} + 5X_{105} + 3X_{106} \tag{122}$$
$$+ 7X_{107} + 7X_{108} + 6X_{109} \tag{123}$$
$$+ 7X_{110} + 9X_{111} + 1X_{112} \tag{124}$$
$$+ 10X_{113} + 8X_{114} + 9X_{115} \tag{125}$$
$$+ 8X_{116} + 8X_{117} + 3X_{118} \tag{126}$$
$$+ 2X_{119} + 9X_{120} + 5X_{121} \tag{127}$$
$$+ 2X_{122} + 2X_{123} + 5X_{124} \tag{128}$$
$$+ 5X_{125} + 4X_{126} + 7X_{127} \tag{129}$$
$$+ 1X_{128} + 4X_{129} + 4X_{130} \tag{130}$$
$$+ 1X_{131} + 9X_{132} + 3X_{133} \tag{131}$$
$$+ 8X_{134} + 2X_{135} + 4X_{136} \tag{132}$$
$$+ 1X_{137} + 8X_{138} + 10X_{139} \tag{133}$$
$$+ 3X_{140} + 4X_{141} + 7X_{142} \tag{134}$$
$$+ 8X_{143} + 1X_{144} + 7X_{145} \tag{135}$$
$$+ 4X_{146} + 2X_{147} + 4X_{148} \tag{136}$$
$$+ 9X_{149} + 10X_{150} + 9X_{151} \tag{137}$$
$$+ 8X_{152} + 9X_{153} + 5X_{154} \tag{138}$$
$$+ 3X_{155} + 3X_{156} + 7X_{157} \tag{139}$$
$$+ 9X_{158} + 6X_{159} + 1X_{160} \tag{140}$$
$$+ 4X_{161} + 4X_{162} + 8X_{163} \tag{141}$$
$$+ 1X_{164} + 10X_{165} + 8X_{166} \tag{142}$$

$$+ 5X_{167} + 4X_{168} + 6X_{169} \tag{143}$$
$$+ 2X_{170} + 8X_{171} + 9X_{172} \tag{144}$$
$$+ 10X_{173} + 8X_{174} + 10X_{175} \tag{145}$$
$$+ 1X_{176} + 7X_{177} + 4X_{178} \tag{146}$$
$$+ 6X_{179} + 10X_{180} + 4X_{181} \tag{147}$$
$$+ 10X_{182} + 1X_{183} + 2X_{184} \tag{148}$$
$$+ 10X_{185} + 5X_{186} + 2X_{187} \tag{149}$$
$$+ 6X_{188} + 8X_{189} + 2X_{190} \tag{150}$$
$$+ 4X_{191} + 3X_{192} + 4X_{193} \tag{151}$$
$$+ 10X_{194} + 8X_{195} + 4X_{196} \tag{152}$$
$$+ 9X_{197} + 9X_{198} + 4X_{199} \tag{153}$$
$$+ 5X_{200} + 3X_{201} + 5X_{202} \tag{154}$$
$$+ 8X_{203} + 8X_{204} + 9X_{205} \tag{155}$$
$$+ 5X_{206} + 2X_{207} + 7X_{208} \tag{156}$$
$$+ 1X_{209} + 1X_{210} + 10X_{211} \tag{157}$$
$$+ 4X_{212} + 6X_{213} + 9X_{214} \tag{158}$$
$$+ 9X_{215} + 1X_{216} + 6X_{217} \tag{159}$$
$$+ 6X_{218} + 9X_{219} + 2X_{220} \tag{160}$$
$$+ 2X_{221} + 9X_{222} + 3X_{223} \tag{161}$$
$$+ 4X_{224} + 9X_{225} + 10X_{226} \tag{162}$$
$$+ 8X_{227} + 7X_{228} + 10X_{229} \tag{163}$$
$$+ 2X_{230} + 8X_{231} + 5X_{232} \tag{164}$$
$$+ 6X_{233} + 2X_{234} + 8X_{235} \tag{165}$$
$$+ 3X_{236} + 7X_{237} + 6X_{238} \tag{166}$$
$$+ 8X_{239} + 6X_{240} + 4X_{241} \tag{167}$$
$$+ 5X_{242} + 1X_{243} + 1X_{244} \tag{168}$$
$$+ 1X_{245} + 3X_{246} + 10X_{247} \tag{169}$$
$$+ 5X_{248} + 7X_{249} + 10X_{250} \tag{170}$$
$$+ 6X_{251} + 8X_{252} + 7X_{253} \tag{171}$$
$$+ 3X_{254} + 6X_{255}$$

3 约束条件

3.1 等式约束 (32 个)

$$= +22 \quad \text{(C\_1)} \tag{172}$$
$$X_{30} + X_{31} = +24 \quad \text{(C\_2)} \tag{173}$$
$$X_{46} + X_{47} = +10 \quad \text{(C\_3)} \tag{174}$$
$$X_{62} + X_{63} = +3 \quad \text{(C\_4)} \tag{175}$$
$$X_{78} + X_{79} = +18 \quad \text{(C\_5)} \tag{176}$$

$$X_{94} + X_{95} = +54 \quad \text{(C\_6)} \tag{177}$$
$$X_{109} + X_{110} + X_{111} = +9 \quad \text{(C\_7)} \tag{178}$$
$$X_{125} + X_{126} + X_{127} = +17 \quad \text{(C\_8)} \tag{179}$$
$$X_{141} + X_{142} + X_{143} = +15 \quad \text{(C\_9)} \tag{180}$$
$$X_{157} + X_{158} + X_{159} = +18 \quad \text{(C\_10)} \tag{181}$$
$$X_{172} + X_{173} + X_{174} + X_{175} = +19 \quad \text{(C\_11)} \tag{182}$$
$$X_{188} + X_{189} + X_{190} + X_{191} = +38 \quad \text{(C\_12)} \tag{183}$$
$$X_{204} + X_{205} + X_{206} + X_{207} = +6 \quad \text{(C\_13)} \tag{184}$$
$$X_{220} + X_{221} + X_{222} + X_{223} = +13 \quad \text{(C\_14)} \tag{185}$$
$$X_{236} + X_{237} + X_{238} + X_{239} = +38 \quad \text{(C\_15)} \tag{186}$$
$$X_{252} + X_{253} + X_{254} + X_{255} = +6 \quad \text{(C\_16)} \tag{187}$$
$$X_{224} + X_{240} = +11 \quad \text{(C\_17)} \tag{188}$$
$$X_{225} + X_{241} = +24 \quad \text{(C\_18)} \tag{189}$$
$$X_{226} + X_{242} = +2 \quad \text{(C\_19)} \tag{190}$$
$$X_{227} + X_{243} = +49 \quad \text{(C\_20)} \tag{191}$$
$$X_{212} + X_{228} + X_{244} = +2 \quad \text{(C\_21)} \tag{192}$$
$$X_{213} + X_{229} + X_{245} = +22 \quad \text{(C\_22)} \tag{193}$$
$$X_{214} + X_{230} + X_{246} = +41 \quad \text{(C\_23)} \tag{194}$$
$$X_{215} + X_{231} + X_{247} = +8 \quad \text{(C\_24)} \tag{195}$$
$$X_{216} + X_{232} + X_{248} = +9 \quad \text{(C\_25)} \tag{196}$$
$$X_{217} + X_{233} + X_{249} = +16 \quad \text{(C\_26)} \tag{197}$$
$$X_{218} + X_{234} + X_{250} = +1 \quad \text{(C\_27)} \tag{198}$$
$$X_{219} + X_{235} + X_{251} = +60 \quad \text{(C\_28)} \tag{199}$$
$$X_{220} + X_{236} + X_{252} = +17 \quad \text{(C\_29)} \tag{200}$$
$$X_{221} + X_{237} + X_{253} = +1 \quad \text{(C\_30)} \tag{201}$$
$$X_{222} + X_{238} + X_{254} = +30 \quad \text{(C\_31)} \tag{202}$$
$$X_{223} + X_{239} + X_{255} = +17 \quad \text{(C\_32)} \tag{203}$$
$$\tag{204}$$

3.2 不等式约束 (288 个)

$$X_0 - 11Y_0 \leq +0 \quad \text{(G0)} \tag{205}$$
$$X_1 - 22Y_1 \leq +0 \quad \text{(G1)} \tag{206}$$
$$X_2 - 2Y_2 \leq +0 \quad \text{(G2)} \tag{207}$$
$$X_3 - 22Y_3 \leq +0 \quad \text{(G3)} \tag{208}$$
$$X_4 - 2Y_4 \leq +0 \quad \text{(G4)} \tag{209}$$
$$X_5 - 22Y_5 \leq +0 \quad \text{(G5)} \tag{210}$$
$$X_6 - 22Y_6 \leq +0 \quad \text{(G6)} \tag{211}$$
$$X_7 - 8Y_7 \leq +0 \quad \text{(G7)} \tag{212}$$
$$X_8 - 9Y_8 \leq +0 \quad \text{(G8)} \tag{213}$$
$$X_9 - 16Y_9 \leq +0 \quad \text{(G9)} \tag{214}$$
$$X_{10} - Y_{10} \leq +0 \quad \text{(G10)} \tag{215}$$

$$X_{11} - 22Y_{11} \leq +0 \quad \text{(G11)} \quad (216)$$

$$X_{12} - 17Y_{12} \leq +0 \quad \text{(G12)} \quad (217)$$

$$X_{13} - Y_{13} \leq +0 \quad \text{(G13)} \quad (218)$$

$$X_{14} - 22Y_{14} \leq +0 \quad \text{(G14)} \quad (219)$$

$$X_{15} - 17Y_{15} \leq +0 \quad \text{(G15)} \quad (220)$$

$$X_{16} - 11Y_{16} \leq +0 \quad \text{(G16)} \quad (221)$$

$$X_{17} - 24Y_{17} \leq +0 \quad \text{(G17)} \quad (222)$$

$$X_{18} - 2Y_{18} \leq +0 \quad \text{(G18)} \quad (223)$$

$$X_{19} - 24Y_{19} \leq +0 \quad \text{(G19)} \quad (224)$$

$$X_{20} - 2Y_{20} \leq +0 \quad \text{(G20)} \quad (225)$$

$$X_{21} - 22Y_{21} \leq +0 \quad \text{(G21)} \quad (226)$$

$$X_{22} - 24Y_{22} \leq +0 \quad \text{(G22)} \quad (227)$$

$$X_{23} - 8Y_{23} \leq +0 \quad \text{(G23)} \quad (228)$$

$$X_{24} - 9Y_{24} \leq +0 \quad \text{(G24)} \quad (229)$$

$$X_{25} - 16Y_{25} \leq +0 \quad \text{(G25)} \quad (230)$$

$$X_{26} - Y_{26} \leq +0 \quad \text{(G26)} \quad (231)$$

$$X_{27} - 24Y_{27} \leq +0 \quad \text{(G27)} \quad (232)$$

$$X_{28} - 17Y_{28} \leq +0 \quad \text{(G28)} \quad (233)$$

$$X_{29} - Y_{29} \leq +0 \quad \text{(G29)} \quad (234)$$

$$X_{30} - 24Y_{30} \leq +0 \quad \text{(G30)} \quad (235)$$

$$X_{31} - 17Y_{31} \leq +0 \quad \text{(G31)} \quad (236)$$

$$X_{32} - 10Y_{32} \leq +0 \quad \text{(G32)} \quad (237)$$

$$X_{33} - 10Y_{33} \leq +0 \quad \text{(G33)} \quad (238)$$

$$X_{34} - 2Y_{34} \leq +0 \quad \text{(G34)} \quad (239)$$

$$X_{35} - 10Y_{35} \leq +0 \quad \text{(G35)} \quad (240)$$

$$X_{36} - 2Y_{36} \leq +0 \quad \text{(G36)} \quad (241)$$

$$X_{37} - 10Y_{37} \leq +0 \quad \text{(G37)} \quad (242)$$

$$X_{38} - 10Y_{38} \leq +0 \quad \text{(G38)} \quad (243)$$

$$X_{39} - 8Y_{39} \leq +0 \quad \text{(G39)} \quad (244)$$

$$X_{40} - 9Y_{40} \leq +0 \quad \text{(G40)} \quad (245)$$

$$X_{41} - 10Y_{41} \leq +0 \quad \text{(G41)} \quad (246)$$

$$X_{42} - Y_{42} \leq +0 \quad \text{(G42)} \quad (247)$$

$$X_{43} - 10Y_{43} \leq +0 \quad \text{(G43)} \quad (248)$$

$$X_{44} - 10Y_{44} \leq +0 \quad \text{(G44)} \quad (249)$$

$$X_{45} - Y_{45} \leq +0 \quad \text{(G45)} \quad (250)$$

$$X_{46} - 10Y_{46} \leq +0 \quad \text{(G46)} \quad (251)$$

$$X_{47} - 10Y_{47} \leq +0 \quad \text{(G47)} \quad (252)$$

$$X_{48} - 3Y_{48} \leq +0 \quad \text{(G48)} \quad (253)$$

$$X_{49} - 3Y_{49} \leq +0 \quad \text{(G49)} \quad (254)$$

$$X_{50} - 2Y_{50} \leq +0 \quad \text{(G50)} \quad (255)$$

$$X_{51} - 3Y_{51} \leq +0 \quad \text{(G51)} \quad (256)$$

$$X_{52} - 2Y_{52} \leq +0 \quad \text{(G52)} \quad (257)$$

$$X_{53} - 3Y_{53} \leq +0 \quad \text{(G53)} \quad (258)$$

$$X_{54} - 3Y_{54} \leq +0 \quad \text{(G54)} \quad (259)$$

$$X_{55} - 3Y_{55} \leq +0 \quad \text{(G55)} \quad (260)$$

$$X_{56} - 3Y_{56} \leq +0 \quad \text{(G56)} \quad (261)$$

$$X_{57} - 3Y_{57} \leq +0 \quad \text{(G57)} \quad (262)$$

$$X_{58} - Y_{58} \leq +0 \quad \text{(G58)} \quad (263)$$

$$X_{59} - 3Y_{59} \leq +0 \quad \text{(G59)} \quad (264)$$

$$X_{60} - 3Y_{60} \leq +0 \quad \text{(G60)} \quad (265)$$

$$X_{61} - Y_{61} \leq +0 \quad \text{(G61)} \quad (266)$$

$$X_{62} - 3Y_{62} \leq +0 \quad \text{(G62)} \quad (267)$$

$$X_{63} - 3Y_{63} \leq +0 \quad \text{(G63)} \quad (268)$$

$$X_{64} - 11Y_{64} \leq +0 \quad \text{(G64)} \quad (269)$$

$$X_{65} - 18Y_{65} \leq +0 \quad \text{(G65)} \quad (270)$$

$$X_{66} - 2Y_{66} \leq +0 \quad \text{(G66)} \quad (271)$$

$$X_{67} - 18Y_{67} \leq +0 \quad \text{(G67)} \quad (272)$$

$$X_{68} - 2Y_{68} \leq +0 \quad \text{(G68)} \quad (273)$$

$$X_{69} - 18Y_{69} \leq +0 \quad \text{(G69)} \quad (274)$$

$$X_{70} - 18Y_{70} \leq +0 \quad \text{(G70)} \quad (275)$$

$$X_{71} - 8Y_{71} \leq +0 \quad \text{(G71)} \quad (276)$$

$$X_{72} - 9Y_{72} \leq +0 \quad \text{(G72)} \quad (277)$$

$$X_{73} - 16Y_{73} \leq +0 \quad \text{(G73)} \quad (278)$$

$$X_{74} - Y_{74} \leq +0 \quad \text{(G74)} \quad (279)$$

$$X_{75} - 18Y_{75} \leq +0 \quad \text{(G75)} \quad (280)$$

$$X_{76} - 17Y_{76} \leq +0 \quad \text{(G76)} \quad (281)$$

$$X_{77} - Y_{77} \leq +0 \quad \text{(G77)} \quad (282)$$

$$X_{78} - 18Y_{78} \leq +0 \quad \text{(G78)} \quad (283)$$

$$X_{79} - 17Y_{79} \leq +0 \quad \text{(G79)} \quad (284)$$

$$X_{80} - 11Y_{80} \leq +0 \quad \text{(G80)} \quad (285)$$

$$X_{81} - 24Y_{81} \leq +0 \quad \text{(G81)} \quad (286)$$

$$X_{82} - 2Y_{82} \leq +0 \quad \text{(G82)} \quad (287)$$

$$X_{83} - 49Y_{83} \leq +0 \quad \text{(G83)} \quad (288)$$

$$X_{84} - 2Y_{84} \leq +0 \quad \text{(G84)} \quad (289)$$

$$X_{85} - 22Y_{85} \leq +0 \quad \text{(G85)} \quad (290)$$

$$X_{86} - 41Y_{86} \leq +0 \quad \text{(G86)} \quad (291)$$

$$X_{87} - 8Y_{87} \leq +0 \quad \text{(G87)} \quad (292)$$

$$X_{88} - 9Y_{88} \leq +0 \quad \text{(G88)} \quad (293)$$

$$X_{89} - 16Y_{89} \leq +0 \quad \text{(G89)} \quad (294)$$

$$X_{90} - Y_{90} \leq +0 \quad \text{(G90)} \quad (295)$$

$$X_{91} - 54Y_{91} \leq +0 \quad \text{(G91)} \quad (296)$$

$$X_{92} - 17Y_{92} \leq +0 \quad \text{(G92)} \quad (297)$$

$$X_{93} - Y_{93} \leq +0 \quad \text{(G93)} \quad (298)$$

$$X_{94} - 30Y_{94} \leq +0 \quad \text{(G94)} \quad (299)$$

$$X_{95} - 17Y_{95} \leq +0 \quad \text{(G95)} \quad (300)$$
$$X_{96} - 9Y_{96} \leq +0 \quad \text{(G96)} \quad (301)$$
$$X_{97} - 9Y_{97} \leq +0 \quad \text{(G97)} \quad (302)$$
$$X_{98} - 2Y_{98} \leq +0 \quad \text{(G98)} \quad (303)$$
$$X_{99} - 9Y_{99} \leq +0 \quad \text{(G99)} \quad (304)$$
$$X_{100} - 2Y_{100} \leq +0 \quad \text{(G100)} \quad (305)$$
$$X_{101} - 9Y_{101} \leq +0 \quad \text{(G101)} \quad (306)$$
$$X_{102} - 9Y_{102} \leq +0 \quad \text{(G102)} \quad (307)$$
$$X_{103} - 8Y_{103} \leq +0 \quad \text{(G103)} \quad (308)$$
$$X_{104} - 9Y_{104} \leq +0 \quad \text{(G104)} \quad (309)$$
$$X_{105} - 9Y_{105} \leq +0 \quad \text{(G105)} \quad (310)$$
$$X_{106} - Y_{106} \leq +0 \quad \text{(G106)} \quad (311)$$
$$X_{107} - 9Y_{107} \leq +0 \quad \text{(G107)} \quad (312)$$
$$X_{108} - 9Y_{108} \leq +0 \quad \text{(G108)} \quad (313)$$
$$X_{109} - Y_{109} \leq +0 \quad \text{(G109)} \quad (314)$$
$$X_{110} - 9Y_{110} \leq +0 \quad \text{(G110)} \quad (315)$$
$$X_{111} - 9Y_{111} \leq +0 \quad \text{(G111)} \quad (316)$$
$$X_{112} - 11Y_{112} \leq +0 \quad \text{(G112)} \quad (317)$$
$$X_{113} - 17Y_{113} \leq +0 \quad \text{(G113)} \quad (318)$$
$$X_{114} - 2Y_{114} \leq +0 \quad \text{(G114)} \quad (319)$$
$$X_{115} - 17Y_{115} \leq +0 \quad \text{(G115)} \quad (320)$$
$$X_{116} - 2Y_{116} \leq +0 \quad \text{(G116)} \quad (321)$$
$$X_{117} - 17Y_{117} \leq +0 \quad \text{(G117)} \quad (322)$$
$$X_{118} - 17Y_{118} \leq +0 \quad \text{(G118)} \quad (323)$$
$$X_{119} - 8Y_{119} \leq +0 \quad \text{(G119)} \quad (324)$$
$$X_{120} - 9Y_{120} \leq +0 \quad \text{(G120)} \quad (325)$$
$$X_{121} - 16Y_{121} \leq +0 \quad \text{(G121)} \quad (326)$$
$$X_{122} - Y_{122} \leq +0 \quad \text{(G122)} \quad (327)$$
$$X_{123} - 17Y_{123} \leq +0 \quad \text{(G123)} \quad (328)$$
$$X_{124} - 17Y_{124} \leq +0 \quad \text{(G124)} \quad (329)$$
$$X_{125} - Y_{125} \leq +0 \quad \text{(G125)} \quad (330)$$
$$X_{126} - 17Y_{126} \leq +0 \quad \text{(G126)} \quad (331)$$
$$X_{127} - 17Y_{127} \leq +0 \quad \text{(G127)} \quad (332)$$
$$X_{128} - 11Y_{128} \leq +0 \quad \text{(G128)} \quad (333)$$
$$X_{129} - 15Y_{129} \leq +0 \quad \text{(G129)} \quad (334)$$
$$X_{130} - 2Y_{130} \leq +0 \quad \text{(G130)} \quad (335)$$
$$X_{131} - 15Y_{131} \leq +0 \quad \text{(G131)} \quad (336)$$
$$X_{132} - 2Y_{132} \leq +0 \quad \text{(G132)} \quad (337)$$
$$X_{133} - 15Y_{133} \leq +0 \quad \text{(G133)} \quad (338)$$
$$X_{134} - 15Y_{134} \leq +0 \quad \text{(G134)} \quad (339)$$
$$X_{135} - 8Y_{135} \leq +0 \quad \text{(G135)} \quad (340)$$
$$X_{136} - 9Y_{136} \leq +0 \quad \text{(G136)} \quad (341)$$

$$X_{137} - 15Y_{137} \leq +0 \quad \text{(G137)} \quad (342)$$
$$X_{138} - Y_{138} \leq +0 \quad \text{(G138)} \quad (343)$$
$$X_{139} - 15Y_{139} \leq +0 \quad \text{(G139)} \quad (344)$$
$$X_{140} - 15Y_{140} \leq +0 \quad \text{(G140)} \quad (345)$$
$$X_{141} - Y_{141} \leq +0 \quad \text{(G141)} \quad (346)$$
$$X_{142} - 15Y_{142} \leq +0 \quad \text{(G142)} \quad (347)$$
$$X_{143} - 15Y_{143} \leq +0 \quad \text{(G143)} \quad (348)$$
$$X_{144} - 11Y_{144} \leq +0 \quad \text{(G144)} \quad (349)$$
$$X_{145} - 18Y_{145} \leq +0 \quad \text{(G145)} \quad (350)$$
$$X_{146} - 2Y_{146} \leq +0 \quad \text{(G146)} \quad (351)$$
$$X_{147} - 18Y_{147} \leq +0 \quad \text{(G147)} \quad (352)$$
$$X_{148} - 2Y_{148} \leq +0 \quad \text{(G148)} \quad (353)$$
$$X_{149} - 18Y_{149} \leq +0 \quad \text{(G149)} \quad (354)$$
$$X_{150} - 18Y_{150} \leq +0 \quad \text{(G150)} \quad (355)$$
$$X_{151} - 8Y_{151} \leq +0 \quad \text{(G151)} \quad (356)$$
$$X_{152} - 9Y_{152} \leq +0 \quad \text{(G152)} \quad (357)$$
$$X_{153} - 16Y_{153} \leq +0 \quad \text{(G153)} \quad (358)$$
$$X_{154} - Y_{154} \leq +0 \quad \text{(G154)} \quad (359)$$
$$X_{155} - 18Y_{155} \leq +0 \quad \text{(G155)} \quad (360)$$
$$X_{156} - 17Y_{156} \leq +0 \quad \text{(G156)} \quad (361)$$
$$X_{157} - Y_{157} \leq +0 \quad \text{(G157)} \quad (362)$$
$$X_{158} - 18Y_{158} \leq +0 \quad \text{(G158)} \quad (363)$$
$$X_{159} - 17Y_{159} \leq +0 \quad \text{(G159)} \quad (364)$$
$$X_{160} - 11Y_{160} \leq +0 \quad \text{(G160)} \quad (365)$$
$$X_{161} - 19Y_{161} \leq +0 \quad \text{(G161)} \quad (366)$$
$$X_{162} - 2Y_{162} \leq +0 \quad \text{(G162)} \quad (367)$$
$$X_{163} - 19Y_{163} \leq +0 \quad \text{(G163)} \quad (368)$$
$$X_{164} - 2Y_{164} \leq +0 \quad \text{(G164)} \quad (369)$$
$$X_{165} - 19Y_{165} \leq +0 \quad \text{(G165)} \quad (370)$$
$$X_{166} - 19Y_{166} \leq +0 \quad \text{(G166)} \quad (371)$$
$$X_{167} - 8Y_{167} \leq +0 \quad \text{(G167)} \quad (372)$$
$$X_{168} - 9Y_{168} \leq +0 \quad \text{(G168)} \quad (373)$$
$$X_{169} - 16Y_{169} \leq +0 \quad \text{(G169)} \quad (374)$$
$$X_{170} - Y_{170} \leq +0 \quad \text{(G170)} \quad (375)$$
$$X_{171} - 19Y_{171} \leq +0 \quad \text{(G171)} \quad (376)$$
$$X_{172} - 17Y_{172} \leq +0 \quad \text{(G172)} \quad (377)$$
$$X_{173} - Y_{173} \leq +0 \quad \text{(G173)} \quad (378)$$
$$X_{174} - 19Y_{174} \leq +0 \quad \text{(G174)} \quad (379)$$
$$X_{175} - 17Y_{175} \leq +0 \quad \text{(G175)} \quad (380)$$
$$X_{176} - 11Y_{176} \leq +0 \quad \text{(G176)} \quad (381)$$
$$X_{177} - 24Y_{177} \leq +0 \quad \text{(G177)} \quad (382)$$
$$X_{178} - 2Y_{178} \leq +0 \quad \text{(G178)} \quad (383)$$

$$X_{179} - 38Y_{179} \leq +0 \quad \text{(G179)} \quad (384)$$
$$X_{180} - 2Y_{180} \leq +0 \quad \text{(G180)} \quad (385)$$
$$X_{181} - 22Y_{181} \leq +0 \quad \text{(G181)} \quad (386)$$
$$X_{182} - 38Y_{182} \leq +0 \quad \text{(G182)} \quad (387)$$
$$X_{183} - 8Y_{183} \leq +0 \quad \text{(G183)} \quad (388)$$
$$X_{184} - 9Y_{184} \leq +0 \quad \text{(G184)} \quad (389)$$
$$X_{185} - 16Y_{185} \leq +0 \quad \text{(G185)} \quad (390)$$
$$X_{186} - Y_{186} \leq +0 \quad \text{(G186)} \quad (391)$$
$$X_{187} - 38Y_{187} \leq +0 \quad \text{(G187)} \quad (392)$$
$$X_{188} - 17Y_{188} \leq +0 \quad \text{(G188)} \quad (393)$$
$$X_{189} - Y_{189} \leq +0 \quad \text{(G189)} \quad (394)$$
$$X_{190} - 30Y_{190} \leq +0 \quad \text{(G190)} \quad (395)$$
$$X_{191} - 17Y_{191} \leq +0 \quad \text{(G191)} \quad (396)$$
$$X_{192} - 6Y_{192} \leq +0 \quad \text{(G192)} \quad (397)$$
$$X_{193} - 6Y_{193} \leq +0 \quad \text{(G193)} \quad (398)$$
$$X_{194} - 2Y_{194} \leq +0 \quad \text{(G194)} \quad (399)$$
$$X_{195} - 6Y_{195} \leq +0 \quad \text{(G195)} \quad (400)$$
$$X_{196} - 2Y_{196} \leq +0 \quad \text{(G196)} \quad (401)$$
$$X_{197} - 6Y_{197} \leq +0 \quad \text{(G197)} \quad (402)$$
$$X_{198} - 6Y_{198} \leq +0 \quad \text{(G198)} \quad (403)$$
$$X_{199} - 6Y_{199} \leq +0 \quad \text{(G199)} \quad (404)$$
$$X_{200} - 6Y_{200} \leq +0 \quad \text{(G200)} \quad (405)$$
$$X_{201} - 6Y_{201} \leq +0 \quad \text{(G201)} \quad (406)$$
$$X_{202} - Y_{202} \leq +0 \quad \text{(G202)} \quad (407)$$
$$X_{203} - 6Y_{203} \leq +0 \quad \text{(G203)} \quad (408)$$
$$X_{204} - 6Y_{204} \leq +0 \quad \text{(G204)} \quad (409)$$
$$X_{205} - Y_{205} \leq +0 \quad \text{(G205)} \quad (410)$$
$$X_{206} - 6Y_{206} \leq +0 \quad \text{(G206)} \quad (411)$$
$$X_{207} - 6Y_{207} \leq +0 \quad \text{(G207)} \quad (412)$$
$$X_{208} - 11Y_{208} \leq +0 \quad \text{(G208)} \quad (413)$$
$$X_{209} - 13Y_{209} \leq +0 \quad \text{(G209)} \quad (414)$$
$$X_{210} - 2Y_{210} \leq +0 \quad \text{(G210)} \quad (415)$$
$$X_{211} - 13Y_{211} \leq +0 \quad \text{(G211)} \quad (416)$$
$$X_{212} - 2Y_{212} \leq +0 \quad \text{(G212)} \quad (417)$$
$$X_{213} - 13Y_{213} \leq +0 \quad \text{(G213)} \quad (418)$$
$$X_{214} - 13Y_{214} \leq +0 \quad \text{(G214)} \quad (419)$$
$$X_{215} - 8Y_{215} \leq +0 \quad \text{(G215)} \quad (420)$$
$$X_{216} - 9Y_{216} \leq +0 \quad \text{(G216)} \quad (421)$$
$$X_{217} - 13Y_{217} \leq +0 \quad \text{(G217)} \quad (422)$$
$$X_{218} - Y_{218} \leq +0 \quad \text{(G218)} \quad (423)$$
$$X_{219} - 13Y_{219} \leq +0 \quad \text{(G219)} \quad (424)$$
$$X_{220} - 13Y_{220} \leq +0 \quad \text{(G220)} \quad (425)$$

$$X_{221} - Y_{221} \leq +0 \quad \text{(G221)} \tag{426}$$
$$X_{222} - 13Y_{222} \leq +0 \quad \text{(G222)} \tag{427}$$
$$X_{223} - 13Y_{223} \leq +0 \quad \text{(G223)} \tag{428}$$
$$X_{224} - 11Y_{224} \leq +0 \quad \text{(G224)} \tag{429}$$
$$X_{225} - 24Y_{225} \leq +0 \quad \text{(G225)} \tag{430}$$
$$X_{226} - 2Y_{226} \leq +0 \quad \text{(G226)} \tag{431}$$
$$X_{227} - 38Y_{227} \leq +0 \quad \text{(G227)} \tag{432}$$
$$X_{228} - 2Y_{228} \leq +0 \quad \text{(G228)} \tag{433}$$
$$X_{229} - 22Y_{229} \leq +0 \quad \text{(G229)} \tag{434}$$
$$X_{230} - 38Y_{230} \leq +0 \quad \text{(G230)} \tag{435}$$
$$X_{231} - 8Y_{231} \leq +0 \quad \text{(G231)} \tag{436}$$
$$X_{232} - 9Y_{232} \leq +0 \quad \text{(G232)} \tag{437}$$
$$X_{233} - 16Y_{233} \leq +0 \quad \text{(G233)} \tag{438}$$
$$X_{234} - Y_{234} \leq +0 \quad \text{(G234)} \tag{439}$$
$$X_{235} - 38Y_{235} \leq +0 \quad \text{(G235)} \tag{440}$$
$$X_{236} - 17Y_{236} \leq +0 \quad \text{(G236)} \tag{441}$$
$$X_{237} - Y_{237} \leq +0 \quad \text{(G237)} \tag{442}$$
$$X_{238} - 30Y_{238} \leq +0 \quad \text{(G238)} \tag{443}$$
$$X_{239} - 17Y_{239} \leq +0 \quad \text{(G239)} \tag{444}$$
$$X_{240} - 6Y_{240} \leq +0 \quad \text{(G240)} \tag{445}$$
$$X_{241} - 6Y_{241} \leq +0 \quad \text{(G241)} \tag{446}$$
$$X_{242} - 2Y_{242} \leq +0 \quad \text{(G242)} \tag{447}$$
$$X_{243} - 6Y_{243} \leq +0 \quad \text{(G243)} \tag{448}$$
$$X_{244} - 2Y_{244} \leq +0 \quad \text{(G244)} \tag{449}$$
$$X_{245} - 6Y_{245} \leq +0 \quad \text{(G245)} \tag{450}$$
$$X_{246} - 6Y_{246} \leq +0 \quad \text{(G246)} \tag{451}$$
$$X_{247} - 6Y_{247} \leq +0 \quad \text{(G247)} \tag{452}$$
$$X_{248} - 6Y_{248} \leq +0 \quad \text{(G248)} \tag{453}$$
$$X_{249} - 6Y_{249} \leq +0 \quad \text{(G249)} \tag{454}$$
$$X_{250} - Y_{250} \leq +0 \quad \text{(G250)} \tag{455}$$
$$X_{251} - 6Y_{251} \leq +0 \quad \text{(G251)} \tag{456}$$
$$X_{252} - 6Y_{252} \leq +0 \quad \text{(G252)} \tag{457}$$
$$X_{253} - Y_{253} \leq +0 \quad \text{(G253)} \tag{458}$$
$$X_{254} - 6Y_{254} \leq +0 \quad \text{(G254)} \tag{459}$$
$$X_{255} - 6Y_{255} \leq +0 \quad \text{(G255)} \tag{460}$$
$$\tag{461}$$

4 变量定义

4.1 二元变量 (256 个)

$$Y_i \in \{0, 1\}, \quad i \in \{0, 1, 2, \ldots, 255\} \tag{462}$$

二元变量示例 (显示前 50 个，共 256 个):

Y_{254}, 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 206 个二元变量

4.2 连续变量 (256 个)

所有连续变量均为非负实数:

$$X_j \geq 0, \quad j \in \{0, 1, 2, \ldots, 255\} \tag{463}$$

连续变量说明: 模型包含 256 个连续决策变量，所有变量的取值范围均为非负实数域。