For case 9. variables $[P_{g_1}, P_{g_2}, P_{g_3} \cdots P_{g_9}, P_{L_1}, P_{L_2} \cdots P_{L_9}, \theta_1, \theta_2 \cdots \theta_9]$

objective function: min $(\underbrace{A P_g^2 + B P_g^2}_{\text{strictly increase}} + \underbrace{a P_L^2 + b P_L}_{\text{strictly decrease}})$

A matrix (inequality): line flow

$$\begin{array}{cc}
 & \overset{27}{\begin{array}{ccc} 9 & 9 & \end{array}} \\
18 & \left[\begin{array}{c:c:cc}
0 & 0 & B_{14} & -B_{14} \\
 & & B_{45} & -B_{45} \\
 & & \vdots & \\
 & & B_{94} & -B_{94} \\
\hdashline
0 & 0 & -B_{14} & B_{14} \\
 & & -B_{45} & B_{41} \\
 & & \vdots & \\
 & & -B_{94} & B_{94}
\end{array}\right]
\end{array}
\cdot
\overset{27\times 1}{\begin{bmatrix} P_{g_1} \\ \vdots \\ P_{g_9} \\ \hdashline P_{L_1} \\ \vdots \\ P_{L_9} \\ \hdashline \theta_1 \\ \vdots \\ \theta_9 \end{bmatrix}}
=
\overset{18\times 1}{\begin{bmatrix} \text{line limit} \\ \hdashline \text{line limit.} \end{bmatrix}}$$

Aeq (equality)

$$\begin{array}{cc}
 & \begin{array}{ccc} P_g & P_{L_1} & B \end{array} \\
9 & \left[\begin{array}{ccccc|ccc|c}
-1 & & & & & 0 & 0 & \cdots & \\
 & -1 & & & & \vdots & & \vdots & \\
 & & -1 & 0 & & \vdots & & \vdots & B_{bus} \\
 & & & & 0 & \vdots & & \vdots & \\
\vdots & \vdots & \vdots & & \ddots & \vdots & & \vdots &
\end{array}\right]
\end{array}
\begin{bmatrix} P_{g_1} \\ \vdots \\ P_{L_9} \\ \vdots \\ \theta_9 \end{bmatrix}
=
\overset{beq}{\begin{bmatrix} 0 \\ 0 \\ 0 \\ \vdots \\ 0 \end{bmatrix}}$$

bound:

$[P_g \ P_L \ \theta]$

$P_{g\,min} \le P_g \le P_{g\,max}$

$P_{L\,min} \le P_L \le P_{L\,max}$

$-\frac{\pi}{4} \le \theta \le \frac{\pi}{4}$