Definition of the tuning vector θ

The NMPC configuration is parametrized by the column vector

$$\theta^\top = \left[\mathrm{Iter}_{\max},\ \theta_p,\ \theta_m,\ q,\ r^{(u)},\ r^{(\Delta u)}\right].$$

The components satisfy:

$$\begin{aligned}
\mathrm{Iter}_{\max} &\in \{1, 2, \ldots, 300\}, \\
\theta_m &\in \mathbb{Z}_{\geq 0}, \qquad \theta_m \leq 30, \\
\theta_p &\in \mathbb{Z}_{\geq 0}, \qquad \theta_p \leq 60, \\
q &\in [-3, 3]^3, \\
r^{(u)} &\in [-3, 3]^3, \\
r^{(\Delta u)} &\in [-3, 3]^3.
\end{aligned}$$

The weighting matrices are given by

$$Q = \mathrm{diag}(10^q), \quad R_u = \mathrm{diag}(10^{r^{(u)}}), \quad R_{\Delta u} = \mathrm{diag}(10^{r^{(\Delta u)}}).$$

The horizons are

$$\begin{aligned}
m &= \theta_m + 1, \\
p &= \theta_p + m.
\end{aligned}$$