

# Simulation based joint optimization framework

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## 1

$$\begin{aligned} \min \quad & \|H - H_{desired}\|^2 \\ \text{s.t.} \quad & H = \text{model}(\text{params}) \\ & g_i(x) \leq 0, \quad i = 1, 2, \dots, m \end{aligned}$$

where  $g_i(x)$  are constraints comes from dynamics, kinematics and power limitations

## 2

$$\min \quad \|H - H_{desired}\|^2 + \mu \sum_{i=1}^m p_i(x)$$

where  $p_i(x) = (\max\{0, g_i(x)\})^2$ ,  $\mu$  is the penalty factor.