

Original problem

$$\begin{array}{ll}\min & f(x) \\ \text{s.t.} & g_1(x) \leq b_1 \\ & g_2(x) \leq b_2 \\ & \vdots \\ & g_m(x) \leq b_m\end{array}$$



Lagrangian subproblem

$$\begin{array}{ll}\min & f(x) + \sum_{i=1}^k \lambda_i (g_i(x) - b_i) \\ \text{s.t.} & g_{k+1}(x) \leq b_{k+1} \\ & \vdots \\ & g_m(x) \leq b_m\end{array}$$



update $\lambda_1, \lambda_2, \dots, \lambda_k$