KKT条件.

$$\min f_0(x)$$
$$s.t.\ f_i(x) \le 0$$
$$h_i(x) = 0$$

拉格朗日乘子.

$$L(x,y) = f_0(x) - \sum \lambda_i f_i(x)$$
$$\lambda \le 0$$

$$\min C^T x$$
$$s.t.\ Ax = b$$
$$x \ge 0$$

$$L(x,\lambda,v) = C^T x - \lambda^T (Ax-b) - v^T x$$

① $\nabla L(x,\lambda,v) = 0$

$$C^T - \lambda^T A - v^T = 0$$
$$\Leftrightarrow C^T \ge \lambda^T A$$

② 原可行 $Ax=b,\ x \ge 0$

③ 对偶可行 $v \ge 0$

④ 互补松弛 $\begin{cases} \lambda^T (Ax-b) = 0 \\ v^T x = 0 \end{cases}$

$$\Leftrightarrow C^T x = \lambda^T b$$
$$\lambda^T b = g(\lambda) = \inf_x L(x,\lambda,v) = C^T x$$