$$\inf_{v\in K}\sup_{q\in M} L(v,q)$$
(1)
$$L(u,q) \le L(u,p) \le L(v,p) \forall q \in M, \forall v \in K,$$
(2)
$K \subset$
$V, M \subset$
Q
V, Q
$(\cdot,\cdot)_V$
$(\cdot,\cdot)_Q$
$\|\cdot\|_V$
$\|\cdot\|_Q$
$$L(v,q) = \frac{1}{2}a(v,v) - (f,v) + (q,\Phi(v))_Q,$$
(3)
$a(v,v)$
V
$$\exists c_1 > 0 : \forall v \in V a(v,v) c_1 ||v||_V^2.$$
(4)
(f,v)
$\Phi(v):$
$V \to$
Q
Φ
$$\forall v_1, v_2 \in K ||\Phi(v_1) - \Phi(v_2)||_Q \le C_\Phi ||v_1 - v_2||_V.$$
(5)
(u_n, p_n)
$u_n \in$
V
$$\min_{v\in K}(J_a(v) + (p_n, \Phi(v))_Q)$$
(6)
p_{n+1}
M

$$p_{n+1} = \Pi_M(p_n + \rho_n \Phi(u_n)),$$
(7)
ρ_n
Π_M
M
$_e llLipschitz, \rho_n$
$$2d_1\rho_n - C_\Phi^2 \rho^2 \ge \theta > 0,$$
(8)
$\|u_n -$
$u\|[n \to$
$+\infty]0$
ρ_n
$$0 < \rho_n < \frac{2c_1}{C_\Phi^2},$$
(9)
d
$$\min_{x\in K}\left\{\frac{1}{2}Ax\cdot x - l\cdot x\right\}, A \in M^{d\times d}, l \in R$$

$$K := \{x \in R^d \mid g^i\cdot x = 0,\ i = 1,\dots,n,\ g^i\cdot x \le 0,\ i = n+1,\dots,n+m\}, n+m < d,$$

$g^i \in$
R^d
$\lambda \in$
R^{n+m}
$$L(x,\lambda) = \frac{1}{2}Ax\cdot x - l\cdot x + \sum_{i=1}^{n+m}\lambda_i(g^i\cdot x), \lambda_i \ge 0,\ i > n.$$

$$\sum_{i=1}^{n+m}\lambda_i(g^i\cdot x) = \sum_{i=1}^{n+m}\lambda_i\sum_{j=1}^{d} g_j^i x_j = \sum_{j=1}^{d} x_j \sum_{i=1}^{n+m} g_j^i\lambda_i = x\cdot G^t\lambda.$$

x
$L(x,\lambda)$
A

$$Ax = l - G^t\lambda.$$

λ_0
(x^k, λ^k)
ρ_n
ρ
x^{k+1}