

:

: , ()

1.

Kalman

가 1960

(Propoi, 1963; Dreyfus, 1965).

2

가

가

2

(Kleinmann, 1970; Kwon and Pearson, 1977).

1970

가

(Richalet et. al., 1978; Cutler and Ramaker, 1980).

가

가

가

$u(k+j|k)$

가

2

$$\min \sum_{i=1}^m x^T(k+i|k)Qx(k+i|k) + \sum_{i=0}^{m-1} u^T(k+i|k)Ru(k+i|k) + \varepsilon_k^T S \varepsilon_k$$

s.t.

$$x(k+i+1|k) = Ax(k+i|k) + Bu(k+i|k), \quad x(k|k) = x(k),$$

$$u^{\min} \leq u(k+i|k) \leq u^{\max}, \quad i = 0, 1, \dots,$$

$$Gx(k+i|k) \leq g + \varepsilon_k, \quad i = 1, 2, \dots.$$

2

Bitmead et. al. (1990)

Kown and Pearson(1977)

1970

Kown and Pearson(1977)

2

가 0

$$x(k+m|k)=0$$

Keerthi and Gilbert(1988)

90

Rawlings and Muske(1993)

$$\sum_{i=1}^{\infty} x^T(k+i|k)Qx(k+i|k) + \sum_{i=0}^{m-1} u^T(k+i|k)Ru(k+i|k) + \varepsilon_k^T S \varepsilon_k$$

Rawlings

Muske

Zheng and Morari(1995)

Choi and Kwon(submitted)

가

2.2.

가 70
Cutler DMC 가 DMC Richalet
Andersa IDCOM, HIECON . Setpoint
SMPC, Honeywell Profimatics RMPCT Treiber Controls OPC .
ASPEN DMC Setpoint DMC SMPC
.
, , .
IDCOM HIECON , , Andersa
Badgwell(1996) . CPC-V Qin and
CIMPA

2.3.

. 2 2
1990) 2 80 Sznaier and Damborg(1987,
가
가 0 가
Riccati 2 가 Kalman
2 가 2 .
Sznaier Damborg 2
and Rawlings(1996, 1998) . Sokaert
2
Chimielewski and Manousiouthakis(1996)
2 가
Choi and Lee(submitted)

2 가

2 가 Regulation

2 Wright(1996) Interior

Point Algorithm 2 Regulation

2

(Lee and Yu, 1997).

(Tadmor 1992; Lall and Glover, 1994; Lee et. al., 1998).

가 가

가 Choi et. al.(1999)

가

가

Certainty Equivalence Principle

가

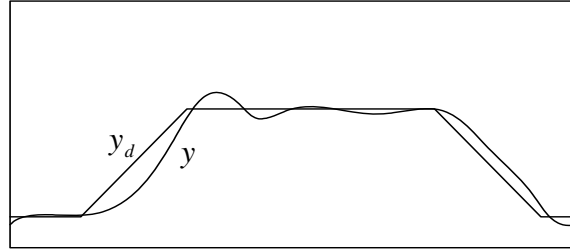
가

Subspace (Moonen 1989; van Overschee and de Moor, 1994)

3.

가 가

가 가



시 간

y_d y 가 가

Arimoto

(Arimoto et. al., 1984).

. 1

$$u_{k+1} = u_k + He_k.$$

$u(k)$ $e(k)$

H

가

D- (Arimoto et. al., 1984),

PID- (Bondi et. al., 1988)

(Bien

and Huh, 1989).

(Togai and Yamano, 1985; Oh et. al., 1988;

Lucibello, 1992; Moore, 1993; Lee et. al., 1994; Yamada et. al., 1994).

가

(Lee et. al., 1996,

Amann et. al., 1996; Lee, Lee and Kim, submitted).

3.1. Q-

가

$$y_k = Gu_k.$$

y_d u_d

$$e_k = y_d - y_k = G(u_d - u_k).$$

$$e_{k+1} = e_k - G(u_{k+1} - u_k) = e_k - G\Delta u_{k+1}.$$

Lee et. al.(1996)

Q-

$$\min e_{k+1}^T Q e_{k+1} + \Delta u_{k+1}^T R \Delta u_{k+1} + \varepsilon_{k+1}^T S \varepsilon_k.$$

Q-

Q-

Q-

Lee, Lee and Kim (submitted) Lee, Lee and Chin(submitted)

Q-

Singular Value Decomposition

(Kim et. al., Submitted).

Q-

(Lee, in press;

Chin et. al., submitted).

Q-

가

Q-

Q-

RTP

(Chung et. al.,

1998).

3.2.

Q-

4.

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