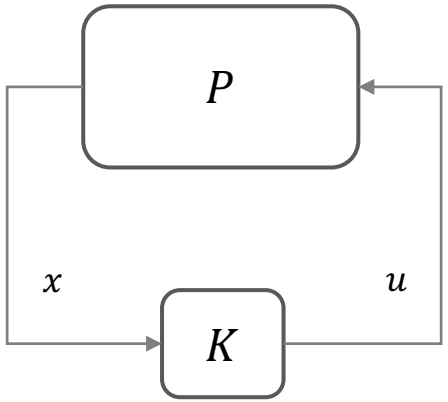
Weekly Report

M2 Ibuki Takeuchi

- Linear Quadratic Regulator

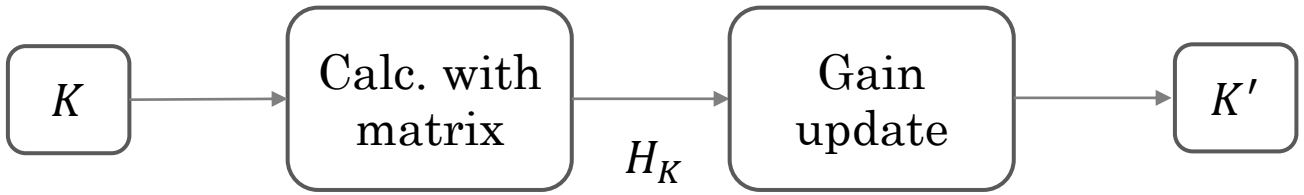


$$\begin{cases} x_{t+1} = Ax_t + Bu_t \\ u_t = Kx_t \end{cases}$$

$$\min \sum_{t=0}^{\infty} (x_t^\top Q x_t + u_t^\top R u_t)$$

(A, B): stab. or ctrb.

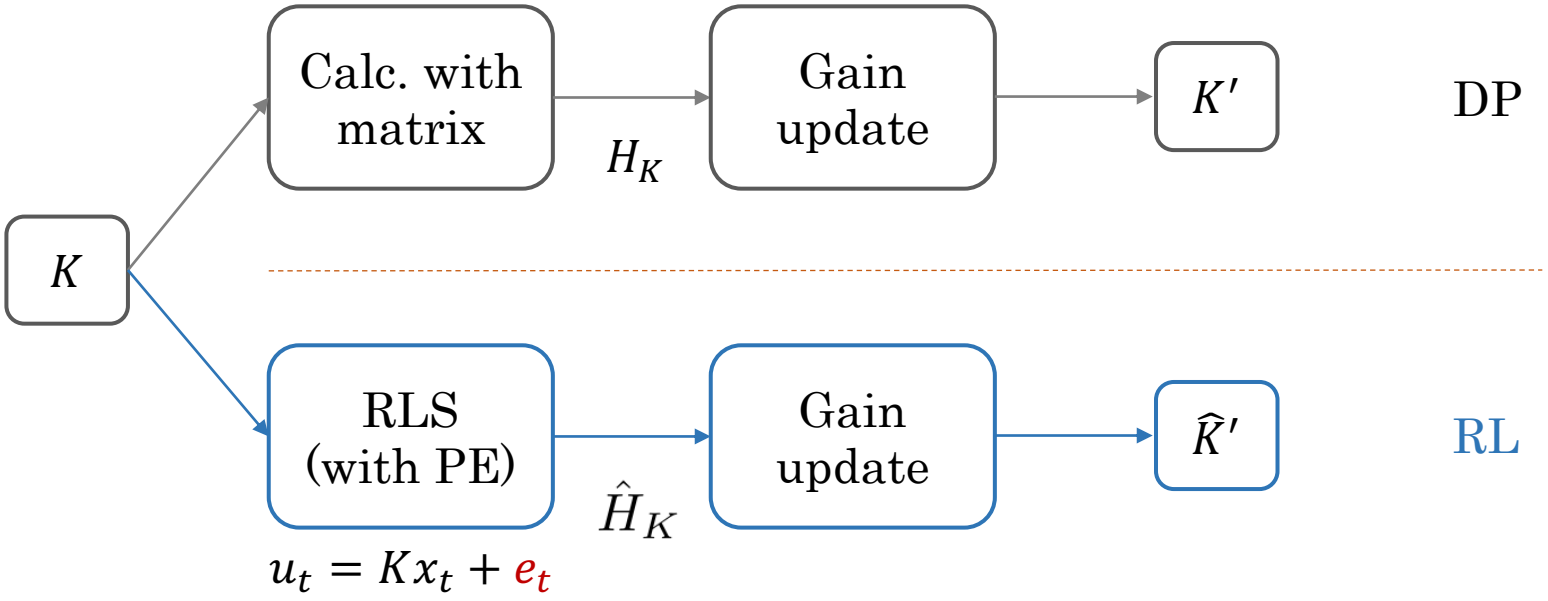
- Reccati eq.
- Dynamic Programming



Weekly Report

M2 Ibuki Takeuchi

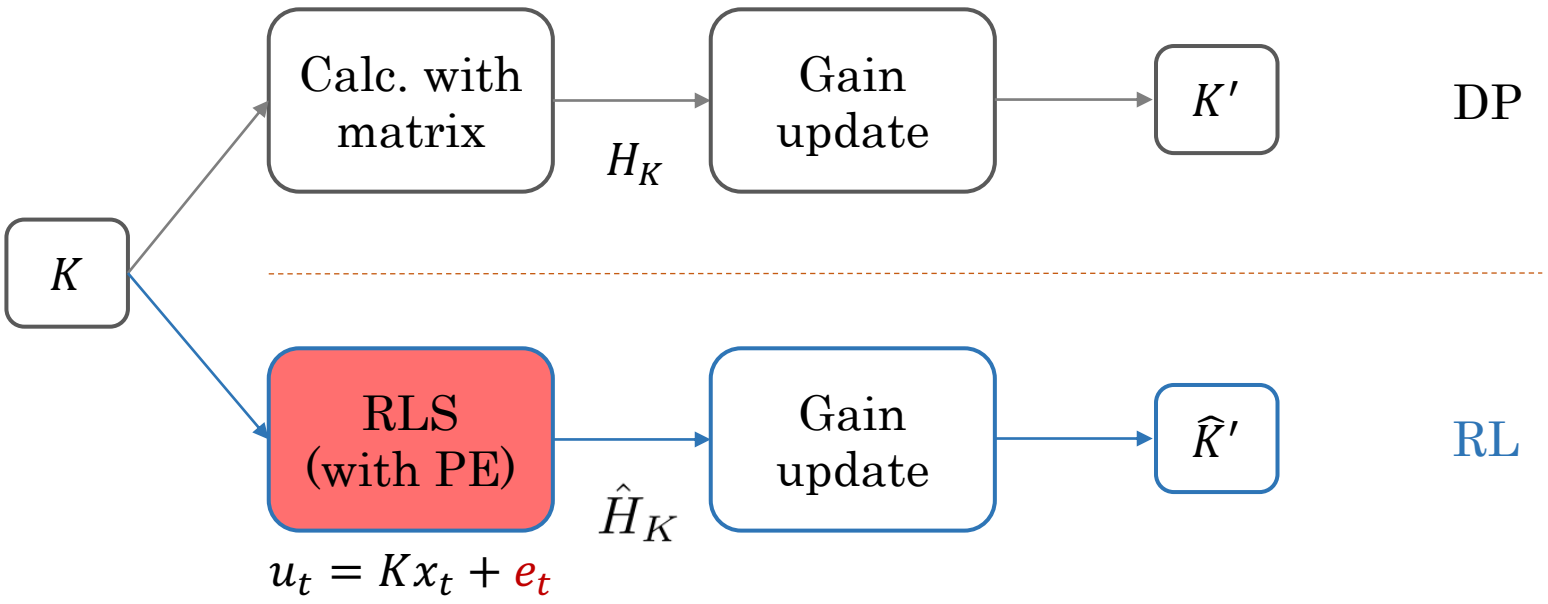
- Reinforcement Learning
  - S. J. Bradtke. “Adaptive Linear Quadratic Control Using Policy Iteration”, 1994
  - Unknown : system and cost matrix A, B, Q, R
  - Known : instantaneous cost $c(x_t, u_t)$, and state x
  - Controllable (not Stabilizable)



Weekly Report

M2 Ibuki Takeuchi

- RL for stabilizable system
  - Exploration noise cannot excite whole system
  - Add system noise to uncontrollable channel for PE



Weekly Report

M2 Ibuki Takeuchi

- In this spring
  - Job hunting
  - Learn about optimal control for stochastic system
    - J.R. Norris. “Optimization and Control”, 2007

- This week
  - Learn about adaptive filter like RLS
  - Consider solutions include problem formulation