

宿題 3-5

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提出場所: room 28

We consider the optimal control problem of finite state systems.

$$\inf_{\substack{u(\tau) \in U \\ \tau \in T}} J(t_0, x_0; u(\cdot))$$

where

$$J(t_0, x_0; u(\cdot)) = \sum_{\tau=t_0}^{t_f-1} \ell(x(\tau), u(\tau)) + \ell_f(x(t_f))$$

and

$$x(t) \in X = \{x_1, x_2, \dots, x_n\}$$

$$u(t) \in U = \{u_1, u_2, \dots, u_m\}$$

$$t \in T = \{t_0, t_0 + 1, \dots, t_f\}$$

$$\phi : X \times U \rightarrow X$$

$$\ell : X \times U \rightarrow \mathbb{R}$$

$$\ell_f : X \rightarrow \mathbb{R}$$

$$x(t+1) = \phi(x(t), u(t))$$

$$\ell(x(t), u(t))$$

$$\ell_f(x(t_f))$$

problem: Develop a computer program that compute the cost-to-go.

- for simplicity, we shall assume that all states can occur at every time-stage.
- you can choose any computer language.
- you should provide a list of program source code, as well as, execution results.
- the execution results should be provided for a variety of problem sizes.
- the program source code should be provided with a rich comment for explanations. This significantly helps the instructor to understand your program source code.
- oh dear, your programming has not been completed! It is ok, probably. You should submit your homework report with partial results, and it should also be explained what a difficulty with you. The instructor may give you a partial score.