

Exercises

Ex. 1 p. 355 (from SSS' book)

Solve the problem

$$\min \int_0^1 (t\dot{x} + \dot{x}^2) dt, \quad x(0) = 1$$

- a) for $x(1)$ free,
- b) for $x(1) \geq 1$.
- c) Show that the solutions are unique.

Ex. 2 p. 355 (from SSS' book)

Consider the variational problem

$$\max \int_0^1 (10 - \dot{x}^2 - 2x\dot{x} - 5x^2)e^{-t} dt, \quad x(0) = 0, \quad x(1) = 1$$

- a) Solve the problem.
- b) What is the optimal solution if the terminal condition is $x(1)$ free.
- c) What is the optimal solution if the terminal condition is $x(1) \geq 2$.