

Exercise 1.9.1

A factory has n suppliers that produce quantities $x_1 \dots x_n$ per day. The factory is connected with suppliers by a system of roads, which can be at variable capacities $c_1 \dots c_n$, so that the factory is supplied daily the amount $x = c_1x_1 + \dots + c_nx_n$.

- (a) Given that the factory production process starts when the supply reaches the critical daily level b , write a formula for the daily factory revenue.
- (b) Formulate the problem as a learning problem.

Exercise 1.9.2

A number of financial institutions, each having a wealth x_i , deposit amounts of money in a fund, at some adjustable rates of deposit w_i , so the money in the fund is given by $x = x_1w_1 + \dots + x_nw_n$. The fund is set up to function as in the following: as long as the fund has less than a certain reserve fund M , the fund manager does not invest. Only the money exceeding the reserve fund M is invested. Let $k = e^{rt}$, where r and t denote the investment rate of return and time of investment, respectively.

- (a) Find the formula for the investment
- (b) Formulate the problem as a learning problem.

Exercise 1.9.3

- (a) Given a continuous function $f : [0, 1] \rightarrow \mathbb{R}$, find a linear function $L(x) = ax + b$ with $L(0) = f(0)$

Exercise 1.9.4