不确定规划课程作业 2

方言
2021210929

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1 Design an uncertain variable whose uncertainty distribution is $\Phi(x) \equiv 0.4$

我们定义:

$$\mathcal{M}\{(-\infty, a]\} = 0.4,\ \mathcal{M}\{(b, +\infty)\} = 0.6,\ \mathcal{M}\{\emptyset\} = 0,\ \mathcal{M}\{\mathcal{R}\} = 1$$

此时 $\mathcal{M}$ 可以推广到 $\mathcal{R}$ 上的布雷尔代数:

$$\mathcal{M}\{B\} = \begin{cases} \inf_{B \subset \bigcup_{i=1}^{\infty} A_i} \sum_{i=1}^{\infty} \mathcal{M}\{A_i\} & \text{if } \inf_{B \subset \bigcup_{i=1}^{\infty} A_i} \sum_{i=1}^{\infty} \mathcal{M}\{A_i\} < 0.5 \\ 1 - \inf_{B \subset \bigcup_{i=1}^{\infty} A_i} \sum_{i=1}^{\infty} \mathcal{M}\{A_i\} & \text{if } \inf_{B \subset \bigcup_{i=1}^{\infty} A_i} \sum_{i=1}^{\infty} \mathcal{M}\{A_i\} < 0.5 \\ 0.5 & \text{otherwise} \end{cases}$$

即:

$$\mathcal{M}\{\wedge\} = \begin{cases} 0 & \text{if } \wedge = \emptyset \\ 1 & \text{if } \wedge = \mathcal{R} \\ 0.5 & \text{otherwise} \end{cases}$$

构造不确定变量 $\xi(\gamma) = \gamma$，其不确定分布为 $\Phi(x) \equiv 0.4$

2 Design an uncertain variable whose uncertainty distribution is $\Phi(x) \equiv 0.6$

我们定义:

$$\mathcal{M}\{(-\infty, a]\} = 0.6,\ \mathcal{M}\{(b, +\infty)\} = 0.4,\ \mathcal{M}\{\emptyset\} = 0,\ \mathcal{M}\{\mathcal{R}\} = 1$$

此时 $\mathcal{M}$ 可以推广到 $\mathcal{R}$ 上的布雷尔代数:

$$\mathcal{M}\{B\} = \begin{cases} \inf_{B \subset \bigcup_{i=1}^{\infty} A_i} \sum_{i=1}^{\infty} \mathcal{M}\{A_i\} & \text{if } \inf_{B \subset \bigcup_{i=1}^{\infty} A_i} \sum_{i=1}^{\infty} \mathcal{M}\{A_i\} < 0.5 \\ 1 - \inf_{B \subset \bigcup_{i=1}^{\infty} A_i} \sum_{i=1}^{\infty} \mathcal{M}\{A_i\} & \text{if } \inf_{B \subset \bigcup_{i=1}^{\infty} A_i} \sum_{i=1}^{\infty} \mathcal{M}\{A_i\} < 0.5 \\ 0.5 & \text{otherwise} \end{cases}$$

即:

$$\mathcal{M}\{\wedge\} = \begin{cases} 0 & \text{if } \wedge = \emptyset \\ 1 & \text{if } \wedge = \mathcal{R} \\ 0.5 & \text{otherwise} \end{cases}$$

构造不确定变量 $\xi(\gamma) = \gamma$，其不确定分布为 $\Phi(x) \equiv 0.6$