

Assignment 1

Assignment answers should be submitted on Moodle in PDF format.

1 Weak preference \geq

Consider the weak preference \geq defined in class. Show that

- it is complete: for every $x, y \in \mathcal{X}$, we have either $x \geq y$ or $y \geq x$.
- it is transitive.

Can you define the indifference relation $=$ without using weak preference?

2 Gambling

You and I play the following game. I toss a coin and observe the outcome. If it's Tails, I continue tossing, and repeat until the outcome is Heads. You give me x dollars if you want to play. I give you 1 dollar if the Tails outcome never occurs, 2 dollars if Tails occurs once, and 2^n dollars if it occurs n times. Suppose that you are risk-neutral (neither risk seeking, nor risk averse), then for what values of x would you choose to play? Suppose that you are risk averse, then for what values of x would you choose to play?

3 Risk pooling

Pick values for h and p ; for instance, $h = 0.2$ and $p = 0.5$. Suppose that the demand random variables D_1, \dots, D_N are independent. Compare S to Σ (cf. class notes for the definitions) for the following settings:

1. (10 points) Let $N = 5$, and let the demand distributions F_1, \dots, F_N all be normal with mean 10 and variance 2.
2. (1 point) Let $N = 10$, and let the demand distributions F_1, \dots, F_N all be normal with mean 10 and variance 2.
3. (1 point) Let $N = 20$, and let the demand distributions F_1, \dots, F_N all be normal with mean 10 and variance 2.
4. (8 points) How does the ratio S/Σ change with N ?

5. (10 points) Let $N = 10$, and let the demand distributions F_1, \dots, F_N all be normal with mean 10 and variance 1.
6. (1 point) Let $N = 10$, and let the demand distributions F_1, \dots, F_N all be normal with mean 10 and variance 2.
7. (1 point) Let $N = 10$, and let the demand distributions F_1, \dots, F_N all be normal with mean 10 and variance 3.
8. (8 points) How does the ratio S/Σ change with the variance?
9. (10 points) What is the take-away lesson from this exercise?