HW 11 A Simple Normal Form Game Against Nature

Wednesday, November 25, 2020 6:11 PM

Passed Solution review

A project faces three potential states of the world with a varying number of users (n): 10, 20, or 80, with probabilities 0.3, 0.5, and 0.2. Three options are available with values per user, v, of $2, $5, and $10, with total costs of 10, 50, and 200, respectively.

a. Set up the normal form representation.

	A	B	C	Exp Value
Probability	.3	.5	.2	
Quantity	10	20	80	
B=$2/ C=$10 1	=(2*10)-10=10	=(2*20)-10=30	=(2*80)-10=150	=(.3*10)+(.5*30)+(.2*150)=48
B=$5/ C=$50 2	=(5*10)-50=0	=(5*20)-50=50	=(5*80)-50=350	=(.3*0)+(.5*50)+(.2*350)=95
B=$10/ C=$200 3	=(10*10)-200=-100	=(10*20)-200=0	=(10*80)-200=600	=(.3*-100)+(.5*0)+(.2*600)=90

b. Find the expected value of each option. Without additional information, which option is best?

See above table for Exp value. Option 2 (B=$5/ and C=$50) is the best

B ↑

c. What would be the value of perfect information about the state of the world before the decision is made?

95-48=47

P(c| A, B, or C)?

I'm definitely missing something but can't figure out what

Tough choices: A, B, and C if n=10, 20, or 80

E(V) = (.3·10) + (.5·50) + (.2·600) = 148

value = 148-95 = 53 → did this in Ø, apparently

d. Suppose the decision maker could purchase information that would reveal, prior to making the decision, whether the number of users will be more than 10 but provide no other insight. What is this information worth?

E(V|A, I) = 10 P(A|A) = 1

E(V| B or C,

E(V| B or C) = (.3·10) + (.5·50) + (.2·600) = 148

Info Value = 148 - 95 = $53

If n=10, A otherwise

E(V[B, N>10) = (.5/.7)(50) + (.2/.7)(350) = 136
E(V[C, N>10) = (.5/.7)(0) + (.2/.7)(600) = 171

Thus C is chosen

E(V|info) = (.3·10) + (.7·171) = 123

Value = 123 - 95 = 28