BSTA 320 – TEST 1 FORMULA SHEET

Decision Under Uncertainty

Maximax Maximin Equally Likely (Laplace) Criterion of Realism (Hurwicz): $\alpha \times$ (best payoff for an alternative) + $(1 - \alpha) \times$ (worst payoff for the alternative) Minimax Regret

Decision Making Under Risk

(Outcomes are also known as States of Nature)

Expected Monetary Value

EMV = (payoff of first outcome) × (probability of first outcome)

- + (payoff of second outcome) × (probability of second outcome)
- +... + (payoff of last outcome) \times (probability of last outcome)

Expected Opportunity Loss

EOL = (regret of first outcome) × (probability of first outcome)

- + (regret of second outcome) × (probability of second outcome)
- +... + (regret of last outcome) \times (probability of last outcome)

Expected Value with Perfect Information

 $EVwPI = (best payoff of the first outcome) \times (probability of first outcome)$

- + (best payoff of the second outcome) × (probability of second outcome)
- +... + (best payoff of the last outcome) \times (probability of last outcome)

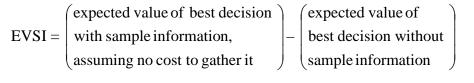
Expected Value of Perfect Information

EVPI = EVwPI - Max EMV

Max EMV: The expected value without information.

Decision Making with Sample Information

Expected Value of Sample Information



= EVwSI - Max EMV

Efficiency =
$$\frac{EVSI}{EVPI}$$

Table: Computation of Posterior Probabilities

(1) Outcome	(2) Prior Probabilities	(3) Conditional Probabilities	(4) Joint Probabilities (2) x (3)	(5) Posterior Probabilities (4) $/\Sigma(4)$

BAYES' THEOREM (for calculation of Posterior Probabilities)

The probability of event B_i given that event A has occurred is given by the formula

$$P(B_{i}|A) = \frac{P(B_{i})P(A|B_{i})}{P(B_{1})P(A|B_{1}) + P(B_{2})P(A|B_{2}) + \dots + P(B_{k})P(A|B_{k})}$$

where B_1, B_2, \dots, B_k are **mutually exclusive** and **collectively exhaustive** events.