

8] ADVANCED DECISION MAKING

DECISION TREES

- Decision node = square box Chance node = circle Possible courses of action = lines between nodes

BAYES' THEOREM

- Based on idea that probabilities in decision trees are actually conditional probabilities
- Conditional probability of A occurring given that B has already occurred:

$$P(A | B) = \frac{P(B | A) \cdot P(A)}{P(B)}$$

- If there are several events possible: $X_1 \dots X_j \dots X_n$, and the estimated probabilities of them occurring are $P(X_1), P(X_i), P(X_n)$, and an experiment is performed leading to event E occurring:

$$P(E) = \sum_{j=1}^n [P(E | X_j) \cdot P(X_j)]$$

$$P(X_j | E) = \frac{P(E | X_j) \cdot P(X_j)}{\sum_{j=1}^n [P(E | X_j) \cdot P(X_j)]}$$

UTILITY

- EMV approach useful when applied to several small decisions
 - However, issues when applied to one off decisions that affect decision maker's resources
 - Eg. Not many people willing to bet their homes despite >50% of getting twice as much
- Utility Curve:
 - Used to convert dollar amounts on a decision tree to utility values before calculating EMV
 - Then proceed to calculate expected mean utility EMU (through normal procedure)

