

STATISTICAL DECISION THEORY - I LINEAR MODELS AND DECISIONS

OUTLINE

GENERAL GAME AGAINST NATURE - DECISION MAKING UNDER UNCERTAINTY

DATA COLLECTION STRATEGIES, DECISION RULES

EMPIRICAL GAME

* NONFORMAL DATA COLLECTION STRATEGY DECISIONS

STATISTICAL GAME

SOME NATURAL CRITERIA FOR OPTIMAL DECISION RULES

TWO DECISION STRATEGIES: BAYES AND MINIMAX

RELATIONS AMONG BAYES, MINIMAX, AND NATURAL CRITERIA

"IN GENERAL, EVERY REALLY GOOD DECISION RULE IS PRACTICALLY BAYES WITH RESPECT TO SOME PRIOR DISTRIBUTION"
PERFUSON, pg. 32

* ACTIONS AS CHOICES OF STATE OF NATURE

* PARAMETERIZATION OF Θ

* ESTIMATION - HYPOTHESIS TESTING DISTINCTION

SUFFICIENT STATISTICS

* SQUARED ERROR LOSS FUNCTIONS - MIN MSE, MVU

HYPOTHESIS TESTING

NULL AND ALTERNATIVE HYPOTHESES

TYPES I, II ERRORS

* SIZE OF TEST = $\alpha = P(\text{TYPE I ERROR})$ POWER OF TEST = $1 - P(\text{TYPE II ERROR}) = 1 - \beta$

UMP

* REASONABLE DECISION RULES - LARGE SAMPLE PROPERTIES

MAXIMUM LIKLIHOOD - ASSOCIATED LARGE SAMPLE PROPERTIES - COMMON ESTIMATORS

LIKLIHOOD RATIO - SOMETIMES KNOWN DISTRIBUTION

SOMETIMES MONOTONIC FUNCTION OF T HAS KNOWN DISTRIBUTION (MANY COMMON TESTS SO DERIVED)

LARGE SAMPLE DISTRIBUTION

* GENERAL LINEAR HYPOTHESIS

ESTIMATION

LEAST SQUARES

* MAXIMUM LIKLIHOOD (NORMALITY ASSUMPTION)

HYPOTHESIS TESTING (NORMALITY ASSUMPTION)

LIKLIHOOD RATIO

* = CONSTRAINTS ON APPLICABILITY OF GAME STRUCTURE OR ON DEFENSIBILITY OF DECISION RULES