

Hard Core	STH454: THEORY OF POINT ESTIMATION	No. of credits: 4
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Course Outcome

CO1: To apply various estimation and testing procedures to deal with real life problems.

CO2: To understand Fisher Information, Lower bounds to variance of estimators, MVUE and apply them in practical situations.

CO3: To understand consistency, sufficiency, unbiasedness, CAN and BAN estimators

Unit I

Parametric models, likelihood function; examples from standard discrete and continuous models.

Information in data. About the parameters as variation in likelihood function, concept of no information, sufficiency, Neyman factorizability criterion, likelihood equivalence. Fisher information for single and several parameters. (10 hrs)

Unit II

Minimal sufficient statistic, Exponential families and Pitman families. Minimum Variance Unbiased Estimation, unbiasedness, locally unbiased estimators, minimum variance, locally minimum variance, mean squared error, Cramer-Rao lower bound approach. (10 hrs)

Unit III

Minimum variance unbiased estimators(MVUE), Rao-Blackwell theorem, completeness, Lehman-Scheffe theorem, necessary and sufficient condition for MVUE. (10 hrs)

Unit IV

Consistent estimation of real and vector valued parameter, invariance of consistent estimator under continuous transformation: Consistency of estimators by method of moments and method of percentiles, mean squared error criterion, Asymptotic relative efficiency. Consistent asymptotic normal (CAN) estimator. (10 hrs)

Unit V

Method of Maximum Likelihood: notion, MLE in exponential family, Cramer Family, Multinomial with all probabilities depending on a parameter, solutions to likelihood equations, method of scoring, Newton-Raphson and other iterative procedures. Fisher lower bound to asymptotic variance, extension to multiparameter case (without proof). (10 hrs)


P.G. BOSH Statistics
Mangalore University
Mangalagangothri - 574 400