Semester-VI

PAPER NO-15: STATISTICAL INFERENCE-II (HYPOTHESIS TESTING)

1. Testing of Hypothesis
   - 1.1 Introduction
   - 1.2 Types of Hypotheses
   - 1.3 Critical Region and Two Kinds of Errors
   - 1.4 Level of Significance and Power of the Test
2. Different Types of Tests
   - 2.1 MP Test and MP Critical Region
   - 2.2 Neyman-Pearson Lemma for Simple Hypotheses
   - 2.3 UMP Tests and UMP Critical Region
3. Likelihood Ratio Tests (LR Tests)
   - 3.1 LR Tests for Simple Null Hypothesis against Simple Alternative Hypothesis
   - 3.2 LR Tests for Simple Null Hypothesis against Composite Alternative Hypothesis
   - 3.3 Properties of LR Tests
4. Sequential Probability Ratio Test (SPRT)
   - 4.1 SPRT Procedures
   - 4.2 OC and ASN functions
   - 4.3 Determination of Stopping Boundaries
5. Non-Parametric Tests
   - 5.1 Difference between Parametric and Non-Parametric Tests, Advantages and Disadvantages of Non-Parametric Tests
   - 5.2 One-Sample and Two-Sample Sign Test
   - 5.3 Wald-Wolfowitz Run Test for Randomness
   - 5.4 Median Test
   - 5.5 Wilcoxon-Mann-Whitney U-Test

WEEK-WISE DETAILS

Week 1-2: Test of Hypothesis

- Gun, A.M., Gupta, M.K. and Dasgupta, B (2005): *An Outline of statistical Theory, Volume II.* World Press. pp. 215-219.
- Mukhopadhyay, N. (2000): *Probability and statistical inference,* Marcel Dekker, Inc. pp. 395-399

Week 3-4: MP Tests

- Gun, A.M., Gupta, M.K. and Dasgupta, B (2005)*: An Outline Of statistical Theory, Volume II,* World Press. pp. 220-252
- Mukhopadhyay, N. (2000): *Probability and statistical inference,* Marcel Dekker, Inc. pp. 399-417

Week 5-6: UMP Tests and UMP Critical Regions

- Gun, A.M., Gupta, M.K. and Dasgupta, B (2005)*: An Outline Of statistical Theory, Volume II,* World Press. pp. 281-290, 293-296
- Mukhopadhyay, N. (2000): *Probability and statistical inference,* Marcel Dekker, Inc. pp. 417-439

Week 7-8: Likelihood Ratio Tests

- Gun, A.M., Gupta, M.K. and, Dasgupta, B. (2005)*: An Outline Of statistical Theory, Volume I,* World Press. pp. 334-447, 456-459, 462
- Mukhopadhyay, N. (2000): *Probability and statistical inference,* Marcel Dekker, Inc. pp. 507-537

Week 9-10 Sequential Probability Ratio Test

- Gun, A.M., Gupta, M.K. and Dasgupta, B. (2005)*: An Outline Of statistical Theory, Volume II,* World Press. pp. 433-489
- Rao, C. R. (2000): Linear Statistical Inference, Wiley. pp.474-490

Week 11-12: Non-Parametric Tests

- Gun, A.M., Gupta, M.K. and Dasgupta, B. (2005)*: An Outline Of statistical Theory, Volume II,* World Press. pp. 533-579
- Wackerly, D.D., Mendenhall, W. and Scheaffer, R.L. (2008)*: Mathematical Statistics with Applications, 7th* Edition, Thomson / Brooks /Cole. pp. 744-765, 777-783

Practical/ Lab work

LIST OF PRACTICALS

1. Type I and Type II errors
2. Most powerful critical region (NP Lemma)
3. Uniformly most powerful critical region
4. Unbiased critical region
5. Power curves
6. Likelihood ratio tests for simple null hypothesis against simple alternative hypothesis
7. Likelihood ratio tests for simple null hypothesis against composite alternative hypothesis
8. Asymptotic properties of LR tests
9. SPRT procedure
10. OC function and OC curve
11. ASN function and ASN curve

Non-Parametric tests

12. One sample sign test
13. Two sample sign test
14. Sign tests for large samples
15. Wilcoxon-Mann-Whitney U-test
16. Median test
17. Wald-Wolfowitz Run test for randomness