

Multivariate statistics

Lecture 04:

Two-sample inference for MVN mean vectors

Literature and Problems: See course schedule

Agenda (preliminary):

SLIDE: Review of 1D paired comparison of normal population means

MVN two-sample paired comparison of mean vectors μ_1 and μ_2

- model and difference model
- hypothesis
- point-estimators for $\mu_1 - \mu_2$ and Σ_{diff}
- Hotelling T^2 test-statistic and its distribution
- hypothesis-test
- confidence region for $\mu_1 - \mu_2$
- simultaneous and Bonferroni CI's for $\mu_{1i} - \mu_{2i}$, $i = 1, 2, \dots, p$

SLIDE: Review of 1D non-paired comparison of normal population means
Case 1: equal population variances

MVN two-sample non-paired comparison of mean vectors μ_1 and μ_2

Case 1: equal population covariance matrices, $\Sigma_1 = \Sigma_2$

- model
- hypothesis
- point-estimators for μ_1 and μ_2
- point-estimator for Σ using “pooling” of sample covariance matrices S_1, S_2
- Hotelling T^2 test-statistic and its distribution
- hypothesis-test
- confidence region for $\mu_1 - \mu_2$
- simultaneous and Bonferroni CI's for $\mu_{1i} - \mu_{2i}$, $i = 1, 2, \dots, p$

SLIDE: Case 2: un-equal population variances

MVN Case 2: un-equal population covariance matrices, $\Sigma_1 \neq \Sigma_2$

- Hotelling T^2 test-statistic and its approximate distribution

Bartlett test for equal population covariance matrices, $\Sigma_1 = \Sigma_2$

- model and hypothesis
 - LR-test-statistic (derivation --> Problem 4.1)
 - finite population correction factor
 - approximate distribution of test-statistic
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