

Some components of this course so far:

Ch 1-2 Basics

Matrix Notation for Multivariate Data p5 and p 120

Descriptive Statistics (sample mean, sample covariance matrix, sample correlation matrix) p9

Plots of Multivariate Data (Matrix Plots, Star Plots, Chernoff Plots, Spin Plots) pp11-30
Usefulness and shortcomings for data analysis.

Statistical Distance – relationship to eigenanalysis – algebra and geometry of projections
Pp30-37 and p 81

Relationship of Covariance matrix to its eigenanalysis p 62-67

Mean and Cov of linear combination of Rvs p 77 and p 143

Quadratic Forms especially $x'Sx$

Ch 3 Sampling

n points in p dimensions vs p points in n dimensions (p 119 for the latter)

biased and unbiased estimates of the population covariance matrix (p 124)

Matrix Operations to yield sample mean,cov,corr (p 139)

Mean and Covariance of AX (p 145)

Ch 4 $N_p(\mu, \Sigma)$ density p150

p=2 formulas in this special case

relationship of density to statistical distance – contours

Properties of $N_p(\mu, \Sigma)$ p 156

Partitioning a Normal RV p 159

Conditional Densities p 163

Distribution Theory for statistical distance in $N_p(\mu, \Sigma)$ p 163

Distribution of Lin Combination of $N_p(\mu, \Sigma)$ rvs p 165

MLE of μ and Σ p 171

Sampling Distribution of Sample Mean and Covariance p 174

CLT Extension to Multivariate

Normal Q-Q plot – construction and utility pp 179ff – coorelation test – p 182

Chi-Sq plot - construction and utility pp 185 ff

Univariate and Mutivariate Outliers p190

Transformations to Symmetry (or near normality) p 194

Ch 5 Inferences about μ

T^2 as a generalization of t (or t^2) p 211

Confidence Regions for μ and relationship to simultaneous confidence regions for $\{\mu_j\}$
and one-at-a-time confidence intervals pp 220-234

Multivariate Quality Control Chart pp239-250

E-M algorithm – utility and general method

Multivariate Time Series – concept only p 256 and p 410

Ch 7 Regression

Multivariate vs Multiple Regression p 354

Notation p 355-6 and p 384

Inference about β p 365-370

Design Matrix p 373

Variability of prediction vs prediction error (pp 374-375)

Leverage and Influence pp 380

C_p and adj R-sq – utility p 381

Design Matrix Induces correlation among estimated β components p 388

Inference about β p 390

Testing Model Components (Normal Theory) – p 393-395

Prediction and Confidence Regions p 398 Fig 7.5

Partial Correlation p 406