Math 566 – Multivariate Statistical Analysis

Course Description from Bulletin: Matrix algebra and random vectors; sample geometry and random sampling; generalized variance; the multivariate normal distribution and wishart distributions; inference about a mean vector; confidence and prediction regions, Hotelling's T^2, covariance; comparisons of several multivariate means; multivariate linear regression models; principal components; factor analysis; discrimination. (3-0-3)

Enrollment: Elective for AM majors.

Textbook(s): Richard A. Johnson, Dean W. Wichern, *Applied Multivariate Statistical Analysis*. Prentice Hall, fifth edition, 2002, ISBN 0130925535.

Other required material: None

Prerequisites: MATH 532, MATH 563 and MATH 564

Objectives:
1. Students will first review basic probability, statistics and matrix algebra.
2. Students will learn the concepts of multivariate distributions such as the generalized normal, the Wishart distribution and the variance-covariance matrix.
3. Students will learn estimation in R^n.
4. Students will learn several techniques for obtaining confidence regions in higher dimensions.
5. Students will learn asymptotic behavior of our sample vectors.
6. Students will learn about maximum likelihood ratio tests and Hotelling's T^2.

Lecture schedule: 3 50 minute (or 2 75 minute) lectures per week

Course Outline:	Hours
1. Review of elementary prob/stats and matrix algebra.	4
2. Sample geometry and random vectors.	5
3. The multivariate normal.	4
4. Inference about a mean vector.	5
5. Comparison of several multivariate means.	5
6. Multivariate linear regression models.	6
7. Principal components.	4
8. Factor analysis and covariance matrices.	5

Assessment:		
	Homework	10-20%
	Computer Programs/Projects	10-40%
	Quizzes	10-20%
	Exams	40-60%
	Final Exam	20-40%

Syllabus prepared by: André Adler
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