机械与动力工程学院博士生资格考试笔试大纲

Syllabus of Ph.D. Qualification Examination (SJTU-ME)

*笔试主题 Exam Topic	（中文）高等统计学 （English）Advanced Statistics
*考核形式 Exam Format	闭卷考试，1 小时 Closed-book exam, 1 hour
*考核目标 Exam Target	高等统计学是面向工业工程与管理专业研究生开设的一门专业基础必修课程。高等统计学资格考试主要考察学生是否掌握扎实的统计学专业知识与主流的统计模型与统计方法；是否具备应用现代统计方法做出创新性成果的潜力。 Advanced Statistics is an important human and social science course, which is set for graduate students of industrial engineering. The target of this course is to test whether the students have mastered basic principles and advanced methods of modern statistics and possessed the ability to apply state-of-the-art methods to do cut-edge researches in industrial engineering.

*考核内容
Exam Contents
	• 多元随机变量及其分布 (Multivariate Random Variables and Distributions)
	  ○ 多项分布 (Multinomial Probability Distribution)
	  ○ 多元正态分布 (Multivariate Normal Distribution)
	• 多元线性回归 (Multivariate Linear Regression)
	  ○ 回归系数估计 (Parameter Estimation)
	  ○ 模型检验与方差分析 (Hypothesis Testing and ANOVA)
	  ○ 模型预测 (Prediction)
	• 非线性回归 (Nonlinear Regression)
	  ○ 支持向量机回归 (Support Vector Regression)
	  ○ 高斯过程回归 (Gaussian Process Regression)
	• 分类 (Classification)
	  ○ 逻辑回归 (Logistic Regression)
	• 聚类 (Clustering)
	  ○ K 均值聚类 (K-means Clustering)
	• 主成分分析 (Principle Component Analysis)

*参考书目 References	1. Trevor Hastie, Robert Tibshirani, and Jerome Friedman, “The Elements of Statistical Learning: Data Mining, Inference, and Prediction.” (2nd Edition) 2. 李航，统计学习方法 (第二版)
备注 Notes	