# 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)

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| *笔试主题<br>Exam Topic | （中文）　　高等运筹学<br>（English）Advanced Operations Research |
| *考核形式<br>Exam Format | 闭卷考试，1 小时<br>Closed-book exam, 1 hour |
| *考核目标<br>Exam Target | 考察学生对高等运筹学重要概念的深入理解，主要数学模型与求解方法的原理与应用，以及不同类型的问题和方法的特点与横向比较。<br>To test students' understanding of the concepts, application of mathematical models and solution methods, and the characteristics and comparison of different types of problems. |
| *考核内容<br>Exam Contents | 1. 线性规划（单纯形法、对偶理论、内点法）<br>2. 交通与网络流问题（问题的单纯形性质与图解法）<br>3. 整数规划及其求解（分支定界法与割平面法）<br>4. 非线性规划及其求解（近似规划法、牛顿法、障碍法、斐波拉契搜索）<br><br>1. Linear programming (Simplex Method, Duality and Complementarity and Interior-Point Methods)<br>2. Transportation problem and network flow problem (Simplex properties and graph-based algorithms)<br>3. Integer programming (Branch and Bound Algorithm and Cutting-plane Method)<br>4. Nonlinear programming (Method of Approximation Programming, Sequential Unrestrained Maximization Technique, Barrier Method, and Fibonacci Search) |
| *参考书目<br>References | Luenberger, D. G., & Ye, Y. (2015). Linear and nonlinear programming. Springer.<br>Hillier, F. S. (2012). Introduction to operations research. Tata McGraw-Hill Education. |
| 备注<br>Notes | |