



ESCUELA TÉCNICA SUPERIOR DE INGENIERÍA
DEPARTAMENTO DE ORGANIZACIÓN INDUSTRIAL

Subject: Stochastic Optimization 2015-16

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Objectives

- ❑ Understand how to model stochastic optimization problems
- ❑ Understand the mathematical techniques
 - ✓ Mathematical principles
 - ✓ Potential use in different contexts



Competencies to be developed

- Understand where to use and concepts of stochastic optimization
- Know how to model efficiently
- Achieve mathematical rigorousness
- Understand the mathematical techniques
- State and solve mockup problems
- Analyze the solutions

Resources

Web page

<http://www.iit.comillas.edu/aramos/OE.htm>

Lecture notes

Slides

GAMS language

Grading system

- ❑ Grades will be a weighted average of:
 - ✓ Class participation (5 %)
 - ✓ Class presentations (15 %)
 - ✓ Technical paper (80 %)

- ❑ **Class participation** accounts for class attendance and active participation
- ❑ Every day there will be one presentation of the current state of development of the projects
- ❑ **Grade of the technical paper must be ≥ 3.5 (over 10)** to consider the other concepts. Otherwise, this grade will be the final one

Contents

1. General overview
2. Two-stage and multistage planning
3. Decomposition techniques
4. Benders decomposition
5. Nested decomposition
6. Dantzig-Wolfe decomposition
7. Lagrangian relaxation
8. Scenario tree
9. Decomposition in two-stage and multistage stochastic planning
10. Improvements in decomposition techniques
11. Simulation in stochastic optimization
12. Stochastic dual dynamic programming