# Optimization Lab for Communication and Signal Processing Using MATLAB

A Modern Introduction to Practical Optimization

Introduction

Consider the following data matrix on the left. Some elements are unknown. Can you still complete this matrix and recover the unknown elements? Or let's have a look at the magnitude spectrum on the right. Is it possible to reconstruct this spectrum using a lower sampling rate than the Nyquist rate? If you are interested in questions like these, this lab will give you the right tools to find answers (and hopefully trigger more questions).

$$\begin{bmatrix} -0.8128 & ??? & -0.3613 \\ -3.9031 & +1.2619 & +1.6307 \\ -2.9999 & +1.0976 & ??? \\ ??? & -0.4092 & +1.0951 \\ +3.2311 & -1.0386 & -1.3697 \\ -0.6033 & +0.2858 & ??? \end{bmatrix}$$
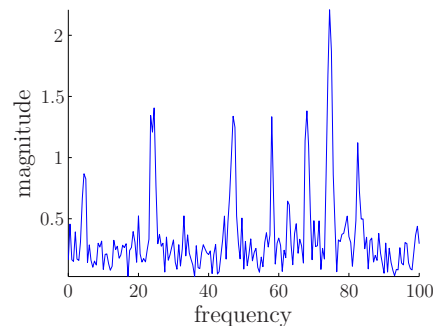
Description

In this course you will learn how to identify, model and solve optimization problems. Topics include but are not limited to:

- Linear Programming

- Quadratic Programming and Least-Squares Problems

- Regularized Approximation and Estimation

- Linear Quadratic Stochastic Control

- Second-order Cone Programming

- Semidefinite Programming

Schedule

The course will be held during the summer term 2011, consisting of 11 sessions of 180 minutes each. Please check CAMPUS or the webpage for additional information. ECTS credits: 4.

Prerequisites

Vordiplom, B.Sc. or equivalent, basic knowledge in probability, linear algebra and MATLAB

Contact

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