

Syllabus

Main Lecturer: Massimo Lauria lauria@csc.kth.se

Homepage: <http://www.csc.kth.se/~lauria/sos14/>

Lecture notes: <https://github.com/MassimoLauria/sos14-handout>



Default schedule and location: the course takes place on Monday and Tuesday between 10:00 and 12:00 in room 4523 (Lindstedtsvägen 3). There will be temporary changes in schedule, as in the first week. **Please check the webpage for updates.**

Evaluation

The course is worth **6 credits**, and there will be **2 problem sets** and **scribe notes duty**. I expect students to submit their homework in English, and to produce them with tools that have good support for math (of course \LaTeX is strongly suggested). In order to succeed the students should pass **all the problem sets** and do a certain amount of scribe notes (the actual amount will depend on the number of people taking the course for credit).

The idea is that every student will **write** two lecture notes, and will **review** two lecture notes. Each such effort will have **its own deadline**. I already scribed the first two lecture notes and provided a template.

There is github repository at <https://github.com/MassimoLauria/sos14-handout> where you can post your scribe notes and your fix. The scheme is the following:

1. every writer and reviewer will fork **my** repository;
2. writers will send pull requests to me to add data to the repository, as often as they feel reasonable;
3. when times come reviewers will send pull requests to me.

It is always a good idea to do small commits and to commit often to your own repository, but please do not flood me with pull requests. It is fine to send me few revisions instead of a single monolithic pull request, but please be moderate. Your own repository instead is your realm and you do as you wish (this is one of the beauties of distributed version control systems).

If you need help with `git` and `github` I am sure some of your colleagues will be generous. Please sort out `git` and `github` as soon as possible.

Lecture notes that are under scribing/review process by one of your colleagues should not be edited by anyone else until “released”. Nevertheless **everyone** is allowed to send pull requests with fixes and improvements to the released notes and to the notation file. A significant effort in this direction may have a **limited** positive influence to the grade. You are **encouraged** to fix, spell check and improve the notes for the first two lectures at any time. This would be particularly appreciated.

Schedule

This is a **tentative** schedule of the course. Both the calendar and the content of some lectures may change. In particular we still need to organize guest lectures. Room 1440 is a backup solution since room 4523 was not available in some dates. I will try to find a better location in time for the guest lectures.

Lecture	Time	Room	Week	Topic
1.	28 Jan, Tue - 10:00-12:00	4523	05	Integer and linear programming; LS, SA relaxations; integrality gaps.
2.	30 Jan, Thu - 14:00-16:00	4523	05	SDP programming and SDP duality.
3.	3 Feb, Mon - 10:00-12:00	1440	06	SDP proof systems: sum of squares, Lasserre, SA+SDP.
4.	4 Feb, Tue - 10:00-12:00	4523	06	Properties of Lasserre hierarchies.
5.	10 Feb, Mon - 10:00-12:00	4523	07	Upper bounds and approximation algorithms (I)
6.	11 Feb, Tue - 10:00-12:00	4523	07	Upper bounds and approximation algorithms (II)
7.	17 Feb, Mon - 10:00-12:00	4523	08	Sum of squares lower bounds for 3-SAT and 3-XOR (I)
8.	18 Feb, Tue - 10:00-12:00	4523	08	Sum of squares lower bounds for 3-SAT and 3-XOR (II)
9.	3 Mar, Mon - 10:00-12:00	4523	10	Rank lower bound for knapsack (I)
10.	4 Mar, Tue - 10:00-12:00	4523	10	Rank lower bound for knapsack (II)
11.	24 Mar, Mon - 10:00-12:00	4523	13	Graph Isomorphism and the Lasserre Hierarchy (I)
12.	25 Mar, Tue - 10:00-12:00	4523	13	Graph Isomorphism and the Lasserre Hierarchy (II)
13.	31 Mar, Mon - 10:00-12:00	4523	14	TBA (Johan Håstad's lecture)
14.	1 Apr, Tue - 10:00-12:00	1440	14	TBA (Johan Håstad's lecture)
15.	7 Apr, Tue - 10:00-12:00	4523	15	TBA (Per Austrin's lecture)
16.	8 Apr, Tue - 10:00-12:00	1440	15	TBA (Per Austrin's lecture)

About the calendar

- **Week 4** (Jan 20 - Jan 26): Banff 2014 workshop: no lectures.
- **Week 9** (Feb 24 - Mar 1): is school vacation: no lectures.
- **Week 11** (Mar 10 - Mar 13): study period.
- **Week 12** (Mar 14 - Mar 21): exams for Ms Students.
- **Week 16-17**: Easter.

Location of the lecture room(s)

- Rooms 4523 (5th floor) and 1440 (4th floor) are located at CSC in the main campus of KTH. There are at least three entrances to the building: Lindstedtsvägen 3, 5 and Osquars backe 2, (the latter is entrance with elevator, no stairs)
- Subway stop: Tekniska Högskolan (red line, direction)