INFORMATION FOR THE RESEARCH SEMINAR "MATHEMATICAL OPTIMIZATION" (SEM 477, MAS 515)

MEGGIE MARSCHNER, JOHANNES-CARL SCHNEBEL AND MATHIAS STAUDIGL

1. General Outline

In this seminar we will jointly discuss the main pillars of *computational game theory*. Game theory is a versatile mathematical modeling tool, which has a long tradition in economics and the political sciences. However, as a mathematical subject, many additional applications outside these traditional application domains have seen relevant contributions. Main examples are mathematical biology (evolutionary game theory), statistical learning (online game theory), as well as engineering and control theory (distributed control). These rather new application domains made it clear that game theory should be studied from a quantitative, mathematical perspective. It is the aim of this seminar, to introduce the student to this important perspective of mathematical game theory. As such, students do not need to have background knowledge on game theory.

We are reading together chapters from the books:

- Christian Kanzow , Alexandra Schwartz: Spieltheorie- Theorie und Verfahren zur Lösung von Nash- und verallgemeinerten Nash-Gleichgewichtsproblemen, Christian Kanzow , Alexandra Schwartz
- Rida Laraki , Jérôme Renault , Sylvain Sorin: Mathematical Foundations of Game Theory

Depending on the background and number of students, additional material will be provided at the beginning of the semester. In particular, we encourage all students who think about writing a Master or Bachelor thesis in optimization-related topics to attend this seminar. Please contact

Prof. Mathias Staudigl (mathias.staudigl@uni-mannheim.de) and

to express your interest and to eventually already discuss some potential topics.

2. Format of the seminar

This seminar is going to be organized as a "research seminar". We will meet on a regular basis and discuss the chapters of the book step by step together. The requirements for passing the seminar are active participation during the semester, a talk at one of the meeting slots and a seminar paper, written individually.