

## GRADUATE SEMINAR ON LOGIC (S4A4) WS 2022/23

### Neostability

**Instructor.** Philipp Hieronymi ([hieronymi@math.uni-bonn.de](mailto:hieronymi@math.uni-bonn.de))

**Time and Place.** Tuesdays 16.15-18, Endenicher Allee 60, N 0.007, Hybrid, expected to start Tuesday October 11th

**Organizational Meeting.** Wednesday July 13th 4pm on Zoom:

<https://uni-bonn.zoom.us/j/64888980208?pwd=eXVocG1xZ25lVlVtMS1h1VEhzRFh5Zz09>

If you are interested in giving a talk, either attend the organizational meeting or send me an email - by the time of the organizational meeting - indicating that you are interested in giving a talk. In the later case, you can include a list of three topics you are most interested in (from the possible topics below) and you can indicate another student with whom you want to give the talks.

**Abstract.** This seminar covers a modern aspect of (pure) model theory: neostability, and in particular, NIP theories. Stability theory is a set of ideas and techniques that originated in the 60's in the work of Morley, and were then further developed by Shelah. The ideas dominated model theory for at least 20 years, but were focused on stable theories (ie. theories in which order is not expressible). Beginning in the early 2000's (maybe partially due to the success of o-minimal theories?) these ideas were systematically studied in settings where order can be presented (ie. in the framework of NIP theories).

In this seminar we will discuss the basics of NIP theories and their connection to and applications in combinatorics. We will mainly follow Simon's book [2] and then finish with a particularly nice application due to Chernikov and Starchenko [1]. Simon's book is available at

[http://www.normalesup.org/~simon/NIP\\_guide.pdf](http://www.normalesup.org/~simon/NIP_guide.pdf)

**Prerequisites.** Basic knowledge of model theory is assumed, as covered in the course *Advanced Mathematical Logic* during the Wintersemester 2021/22. The script for that course is available on the E-Campus website for this seminar.

#### Talks.

- (1) [2] Section 1.1, Section 2.1 and 2.2, Definitions, NIP, Invariant types (3 talks)
- (2) [2] Chapter 3, Honest Defintions (2 talks)
- (3) [2] Chapter 4, Strong dependence and dp-ranks (2 talks)
- (4) [2] Chapter 6, Finite Combinatorics (2 talks)
- (5) [2] Chapter 7, Measures (2 talks)
- (6) [2] Chapter 9, Distality (2 talks)
- (7) [1] Strong Erdős-Hajnal for distal structures (2 talks)

## REFERENCES

1. Artem Chernikov and Sergei Starchenko, *Regularity lemma for distal structures*, J. Eur. Math. Soc. (JEMS) **20** (2018), no. 10, 2437–2466. MR 3852184
2. Pierre Simon, *A guide to nip theories*, Lecture Notes in Logic, vol. 44, Cambridge University Press, 2015.