universität wien

**FAKULTÄT FÜR MATHEMATIK**
**Dekan Univ.-Prof. Dr. Christian Krattenthaler**

Einladung zur öffentlichen Defensio von

## Gabriel Strasser

Thema der Dissertation:

# Adic and Symbolic Dynamical Systems

Abstract:
Symbolic dynamics evolved as a tool for analysing general dynamical systems by discretising time and space. In many cases the shift transformation on the symbolic space shares the same dynamical properties as the transformation on the original system. Another type of symbolic system was introduced by A. Vershik in 1982. Here the dynamics arises from a transformation acting on the path space of a so-called Bratteli diagram. Dynamical systems obtained in this way are called adic systems.
In our thesis we discuss three distinct symbolic systems. First, we investigate dynamical properties of generalisations of the Eulerian adic system. The Eulerian adic system inherits its name from its underlying Bratteli diagram whose number of paths from the root to a fixed vertex is related to the Eulerian number. Our second topic treats permutations of $\mathbb{Z}^d$ with restricted movement, i.e., the set of permutations $\pi$ of $\mathbb{Z}^d$ such that for each $\mathbf{n} \in \mathbb{Z}^d$ the 'movement' $\pi(\mathbf{n}) - \mathbf{n}$ lies in a prescribed finite set $A \subset \mathbb{Z}^d$. We identify this set with a higher-dimensional subshift of finite type through which we determine dynamical properties of this class of permutations.
In our last problem we consider a class of abelian sandpile models each of which is represented by a higher-dimensional subshift. Dynamical properties of these physical toy models are retrieved from corresponding algebraic models. In this talk we focus on abelian sandpiles and algebraic models.
Motivated by the coincidence of topological entropies the connection between a particular abelian sandpile and algebraic model (the harmonic model) was established by K. Schmidt and E. Verbitskiy (2009). Moreover, a small class of dissipative sandpile models were shown to be symbolic representations of their algebraic counterparts. We extend this result to a wider class of sandpile models and explain how the abelian group structure of the sandpile model reflects that of the algebraic model.

Prüfungssenat:

ao. Univ.-Prof. Mag. Dr. Günther Hörmann (Vorsitz)
(Universität Wien)

emer. o. Univ.-Prof. Dr. Klaus Schmidt
(Universität Wien)

Assoz. Prof. Mag. Dr. Roland Zweimüller, Privatdoz.
(Universität Wien)

Prof. Dr. Evgeny Verbitskiy
(Universität Leiden)

**Zeit:** Dienstag, 24. Oktober 2017 , 13:15 Uhr

**Ort:** Fakultät für Mathematik, Seminarraum 13 , Oskar-Morgenstern-Platz 1