## Einladung

zum

## Mathematischen Kolloquium

im Rahmen des

## 2nd Bilateral Workshop on Applied Mathematics Bayreuth-Tel Aviv

Am Donnerstag, dem 17. Oktober 2019, spricht

**Herr Prof. Dr. Michael Margaliot,**
**School of Electrical Engineering and the Sagol School of Neuroscience**
**Tel Aviv University**
**Gast am Lehrstuhl für Angewandte Mathematik**
**bei Herrn Prof. Dr. Lars Grüne**

über das Thema

### *A Generalization of Linear Positive Systems with Applications to Nonlinear Systems: Invariant Sets and the Poincare-Bendixon Property*

### Abstract

The dynamics of linear positive systems maps the positive orthant to itself. In other words, it maps a set of vectors with zero sign variations to itself. This raises the following question: what linear systems map the set of vectors with k sign variations to itself? We address this question using tools from the theory of cooperative dynamical systems and the theory of totally positive matrices. This yields a generalization of positive linear systems called k-positive linear systems, that reduces to positive systems for k=1. We describe applications of this new type of systems to the analysis of nonlinear dynamical systems. In particular, we show that such systems admit certain explicit invariant sets, and for the case k=2 establish the Poincare-Bendixon property for certain trajectories.
The talk is based on joint work with Eyal Weiss.

**Beginn:** 16.30 Uhr (Kaffee/Tee ab 16.00 Uhr im Seminarraum 748)
**Ort:** Hörsaal H 19, Gebäude Naturwissenschaften II, Universitätsgelände

gez. A. Schiela