

Programm zum 23. SEG-Workshop  
am 26. Juni 2018  
im Raum 273 in der Straße der Nationen 62

Non-linear Generalizations of Algebraic Connectivity  
(15:30 Uhr)

Uwe Schwerdtfeger (TU Chemnitz)

We generalize the notion of algebraic connectivity, the second smallest eigenvalue of the graph Laplacian matrix, by varying the norms in the Rayleigh-Ritz characterization. The so obtained parameters are shown to be well-defined and to be the least non-zero eigenvalues of the corresponding non-linear eigenvalue problem whenever the graph is connected. We provide combinatorial interpretations of several non-smooth cases.

This is joint work with Max Borba.

Discount Problems based on Loyalty Cards with Stamps  
(16:00 Uhr)

Michael Reißner (TU Chemnitz)

In daily life one is even in seemingly simple situations confronted with surprisingly complex tasks. Here the situation of buying a certain good a fixed number of times is considered under the assumption that each trader offers a loyalty stamp-card. It turns out that the optimization problem of paying minimum costs when buying multiple instances of a good from different traders under these circumstances is (NP-) hard.

Pause (16:30 Uhr)

## A Recursion on Neighborhood Polynomials and its Applications (17:00 Uhr)

Maryam Alipour (University of Applied Sciences Mittweida)

The neighborhood polynomial of graph  $G$  is the generating function for the number of vertex subsets of  $G$  of which the vertices have a common neighbor in  $G$ . Here, we investigate the behavior of this polynomial under several graph operations and their generalizations. We provide an explicit formula for the neighborhood polynomial of the graph obtained from a given graph  $G$  by vertex attachment. We use this result to propose a recursive algorithm for the calculation of the neighborhood polynomial. Finally, as an application, together with some examples, we prove that the neighborhood polynomial can be calculated in polynomial-time in the class of  $k$ -degenerate graphs.

## INTERVAL PARTITIONS OF THE VERTEX SET OF A GRAPH (17:30 Uhr)

Kristina Dedndreaj (University of Applied Sciences Mittweida)

It is known that the Boolean lattice can be partitioned into Dawson intervals which in a matroid are expressed via internal and external activities of the bases as defined by Tutte (Dawson, 1981). Since the edge set of a graph has a matroid structure we can apply this construction to the graphs. This means that each spanning subgraph of a connected graph can be constructed from edges of exactly one spanning tree by deleting a unique subset of internally active edges and adding a unique subset of externally active edges (Trinks, 2013). A similar construction for the vertex set of a graph is faced with additional challenges since it does not have a matroid structure. In this talk, we will discuss the interval partitions of the Boolean lattice of the vertex set of a graph using the adapted version of the internal and external activities in the context of vertices.

Abendessen (18:15 Uhr) im Ratskeller