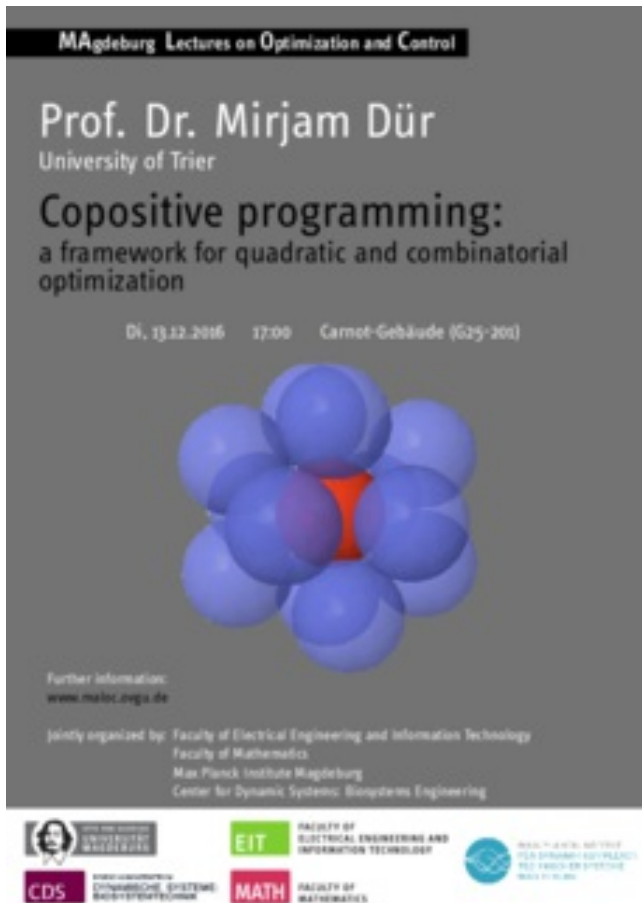


## MAGDEBURG LECTURES ON OPTIMIZATION AND CONTROL

### Mirjam Dür



MAGdeburg Lectures on Optimization and Control

Prof. Dr. Mirjam Dür  
University of Trier

**Copositive programming:**  
a framework for quadratic and combinatorial  
optimization

Di. 13.12.2016 17:00 Carnot-Gebäude (G25-201)

Further information:  
[www.mabz.ovgu.de](http://www.mabz.ovgu.de)

Jointly organized by: Faculty of Electrical Engineering and Information Technology  
Faculty of Mathematics  
Max Planck Institute Magdeburg  
Center for Dynamic Systems: Biosystems Engineering

CDS EIT MATH

### Copositive programming: a framework for quadratic and combinatorial optimization

› Prof. Dr. Mirjam Dür

(<https://www.math.uni-trier.de/~duer/>) Department of  
Mathematics  
University of Trier

#### Time & Place

The presentation on December 13, 2016 will be  
given in the Carnot-Gebäude G25 in Room 201  
and starts at 5.00 p.m..

#### Abstract

A copositive optimization problem is a problem in  
matrix variables with a constraint which requires  
that the matrix be in the copositive cone. This  
means that its quadratic form takes nonnegative  
values over the nonnegative orthant. Many  
combinatorial problems like for example the  
maximum clique problem can be equivalently  
formulated as a copositive problem. Burer (2009)  
showed that also any nonconvex quadratic  
problem with linear constraints and binary  
variables can be reformulated as such a  
copositive problem. This is remarkable, since by  
this approach, a nonconvex problem is

reformulated equivalently as a convex problem. The complexity of the original problem is entirely  
shifted into the cone constraint. We review recent progress in this area, concerning both theoretical  
results and numerical issues. In particular, we show how this approach can be used to deal with the  
stable set problem for infinite graphs, an application of which is the famous kissing number problem.

The lecture is part of the ›10th CDS anniversary

([http://www.cds.ovgu.de/News/Veranstaltungen/13\\_+Dezember+Festveranstaltung+10+Jahre+CDS-p-280.html](http://www.cds.ovgu.de/News/Veranstaltungen/13_+Dezember+Festveranstaltung+10+Jahre+CDS-p-280.html)).