



Master Fachseminar on Real Algebraic Geometry

organized by Dr. Maria Infusino and Prof. Salma Kuhlmann

Lower bounds for the minimum of a polynomial using geometric programming

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November 11th, 15.15 – 16.45, Room F426

Abstract. Finding the global minimum of a polynomial $f \in \mathbb{R}[X]$ in $n \in \mathbb{N}$ variables over the real numbers is a mathematical problem with a vast number of applications. Whereas it is easy and straightforward in the univariate case, the multivariate case is much more complex and there are several approaches to this problem in the literature. Ghasemi, Lasserre and Marshall proved in 2013 that a lower bound $f_{\text{gp},M}$ on the global minimum of f can be obtained by solving a suitable geometric programming. In this talk, we will first introduce geometric programming and then use it to determine $f_{\text{gp},M}$. For this proof some results from an earlier publication of Ghasemi and Marshall in 2012 will be used. Furthermore, we will show a connection between the computation of $f_{\text{gp},M}$ and sum-of-squares.