

Closure and saturation of finitely generated preorderings and quadratic modules of $\mathbb{R}[\underline{x}]$

Murray Marshall, University of Saskatchewan, Canada

(Joint work with T. Netzer, S. Kuhlmann and J. Cimprič)

Let K be a basic closed semialgebraic set of \mathbb{R}^n defined by polynomial inequalities $g_i \geq 0$, $i = 1, \dots, s$; $\text{Pos}(K) = \{f \in \mathbb{R}[\underline{x}] \mid f \geq 0 \text{ on } K\}$; T = the preordering or quadratic module of $\mathbb{R}[\underline{x}]$ generated by g_1, \dots, g_s ; \overline{T} = the closure of T with respect to the unique finest locally convex topology on $\mathbb{R}[\underline{x}]$. In recent years various people have struggled to understand the relationship between T, \overline{T} and $\text{Pos}(K)$. Obviously $T \subseteq \overline{T} \subseteq \text{Pos}(K)$. I will give some of my thoughts on this subject, part of the beginning of a joint project with T. Netzer and J. Cimprič, and will also mention new results in the compact case, part of joint work with S. Kuhlmann and J. Cimprič.