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On the real multidimensional rational $K$-moment problem

We present a solution to the real multidimensional rational $K$-moment problem, where $K$ is defined by finitely many polynomial inequalities. More precisely, let $S$ be a finite set of real polynomials in $\mathbf{X} = (X_1, \ldots, X_n)$ such that the corresponding basic closed semialgebraic set $K_S$ is nonempty. Let $E = D^{-1}\mathbb{R}[\mathbf{X}]$ be a localization of the real polynomial algebra, and $T^E_S$ the preordering on $E$ generated by $S$. We show that every linear functional $L$ on $E$ such that $L(T^E_S) \geq 0$ is represented by a positive measure $\mu$ on a certain subset of $K_S$, provided $D$ contains an element that grows fast enough on $K_S$. 