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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 $\underline{X} = (X_1, \ldots, X_n)$ such that the corresponding basic closed semialgebraic set K_S is nonempty. Let $E = D^{-1}\mathbb{R}[\underline{X}]$ be a localization of the real polynomial algebra, and T_S^E the preordering on E generated by S. We show that every linear functional L on E such that $L(T_S^E) \geq 0$ is represented by a positive measure μ on a certain subset of K_S, provided D contains an element that grows fast enough on K_S.