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Algebras generated by reciprocals of linear forms

Let Δ be a finite set of nonzero linear forms in several variables with coefficients in a field $\mathbf{K}$ of characteristic zero. Consider the $\mathbf{K}$-algebra $C(\Delta)$ of rational functions generated by $\{1/\alpha \mid \alpha \in \Delta\}$. Then the ring $\partial(V)$ of differential operators with constant coefficients naturally acts on $C(\Delta)$. We study the graded $\partial(V)$-module structure of $C(\Delta)$. We especially find standard systems of minimal generators and a combinatorial formula for the Poincaré series of $C(\Delta)$. The results are stated in terms of the arrangement $\mathcal{A}_\Delta$ associated with Δ. Our proofs are based on a theorem by Brion-Vergne and results by Orlik-Terao.

A preprint is available at

http://arxiv.org/abs/math.CO/0105095