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A geometric approach to Carlitz-Dedekind sums

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Abstract

A Carlitz polynomial is the polynomial generalization of the Dedekind sum, which in turn is an arithmetic sum playing a central role in various mathematical areas, such as theta functions, group actions on manifolds, and integer-point enumeration in polytopes. The most important property of any Dedekind-like sum is reciprocity. Carlitz proved algebraically such a reciprocity law for his polynomials. I will give a geometric proof of Carlitz reciprocity and show some extensions of this approach that have arisen including a new relation for lattice points in polyhedra.