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Growth Series of Cyclotomic and Root Lattices

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The coordination sequence of a lattice L encodes the word-length function with respect to a fixed set of monoid generators of L . We investigate the coordination sequences of cyclotomic lattices $Z[\zeta_m]$, where ζ_m is a primitive m 'th root of unity, and root lattices of type A, C, and D. Our methods are based on unimodular triangulations of the contact polytope of the lattice, the convex hull of the monoid generators, and combine results from commutative algebra, number theory, and discrete geometry.

This is joint work with Federico Ardila (S.F. State), Serkan Hosten (S.F. State), Julian Pfeifle (Barcelona), and Kim Seashore (Berkeley).

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