Growth Series of CAT(0) Cubical Complexes

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Abstract. Let X be a CAT(0) cubical complex. If X is cocompact, the growth series of X at x, $G_x(t) = \sum_{y \in X} t^{d(x,y)}$, is a rational function of t. In the case when X is the Davis complex of a right-angled Coxeter group it is well-known that $G_x(t) = 1/f_L(-t/(1+t))$, where f_L denotes the f-polynomial of the link L of a vertex of X. We obtain a similar formula for general cocompact X. We also obtain a simple relation between the growth series of individual orbits and the f-polynomials of various links. In particular, we get a simple proof of reciprocity of these series ($G_x(t) = \pm G_x(t^{-1})$) for an Eulerian manifold X. This a joint work with Rick Scott (Santa Clara University).