

## Higher order Dehn functions of groups

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### **Abstract**

The ordinary Dehn function  $\delta(n)$  of a finite presentation of a group  $G$  gives an upper bound on the number of 2-cells needed to describe a null-homotopy of an edgepath loop of length  $n$  in the Cayley 2-complex associated with this finite presentation of  $G$ . The asymptotic behavior of  $\delta(n)$  is a quasi-isometry invariant of the group  $G$ .

For groups of type  $F_{k+1}$  there are order  $k$  versions of the ordinary Dehn function. These *order  $k$  Dehn functions* measure the number of  $(k + 1)$ -cells necessary to describe a null homotopy of a  $k$ -sphere in a  $(k + 1)$ -dimensional version of the Cayley complex for the group. For each integer  $k \geq 1$  we produce groups of type  $F_{k+1}$  whose order  $k$  Dehn functions are of the form  $x^a$  for a wide range of exponents  $a$ .