Introduction to Topological Dehn Functions

Abstract:

Homological and homotopical dehn functions are different ways of measuring the difficulty of filling a curve in a space $X$. In particular, the homological dehn function, $F V_{X}^{n+1}$, measures fillings of $n$-cycles by $(n+1)$-chains, while the homotopical dehn function, $\delta_{X}^{n}$, measures fillings of $n$-spheres by $(n+1)$-balls.

A major result of Gromov (later in full generality by Alonso, Wang, and Pride) states if $X$ is $n$-connected and $G$ acts on $X$ geometrically, then the growth rates of $F V_{X}^{n+1}$ and $\delta_{X}^{n}$ depend only on $G$.

I will give basic definitions, discuss some results on how $\delta_{G}^{n}$ and $F V_{G}^{n+1}$ relate to each other, and how dehn functions of subgroups relate to that of the original group. This is based on joint work with Eduardo Martinez-Pedroza.