Group Action on the Neighborhood Complexes of Cayley Graphs

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Abstract: Given $G$ a group and a generating set, one can construct the Cayley Graph. With a set $D$ of comprised of positive integers and perhaps zero and the Cayley graph one can construct a $D$-neighborhood complex. This neighborhood complex is a simplicial complex thus it is natural to form an associated chain complex. The group $G$ acts naturally on the Cayley graph. Thus induces actions on the neighborhood complex, the chain complex and the homology of the chain complex. These group actions gives rise to several representations of $G$. This talk will discuss the interplay between generated groups (i.e. a group together with a set of generators), corresponding representations on their associated $D$-neighborhood complexes, and the homology of the $D$-neighborhood complexes.