The Structure of Combinatorial Geodesics in $\text{CAT}(0)$ Simplicial 3-Complexes.

In a simplicial complex, the combinatorial metric on the 0-skeleton is defined by taking the distance between vertices $v$ and $w$ to be the minimum length of edge paths in the between them. Paths of minimal length are combinatorial geodesics. In this talk, I will discuss the structure of combinatorial geodesics in CAT(0), simplicial 3-complexes and use this structure to give a metric proof of the following theorem; groups acting geometrically on CAT(0), simplicial 3-complexes are biautomatic, a condition that gives a positive solution to both the word problem and the conjugacy problem for these groups. (Received September 22, 2009)