

8-located complexes and $5/9$ -complexes

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We study two combinatorial curvature conditions on a flag simplicial complex. The first condition was introduced by Damian Osajda. It is called m -location ($m > 6$). A flag simplicial complex is m -located if any of its full homotopically trivial loops of length at most m is contained in the link of a vertex. We present some properties of m -located complexes. 8 -location and simple connectivity imply Gromov hyperbolicity. 7 -located simplicial complexes satisfy a quadratic isoperimetric inequality. We investigate the structure of the minimal displacement set in 8 -located complexes with the SD' -property. We show that this set embeds isometrically into the complex and that it is systolic. The second condition we discuss is called the $5/9$ -condition. We prove the minimal filling diagrams lemma for $5/9$ -complexes. Then we show that the $5/9$ -condition on a simplicial complex implies the Gromov hyperbolicity of its universal cover. This follows as an application of 8 -location.