

Curves in the four sphere in the curve graph of closed surfaces

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Abstract

Let S_g be a closed surface of genus $g \geq 2$. In 1978, William J. Harvey introduced a finite dimensional simplicial complex corresponding to S_g , called the complex of curves of S_g , as a tool to study the Teichmüller spaces of Riemann surfaces. Since then it has also been used to study the hyperbolic structures of 3-manifolds and the mapping class group of S_g . The 1-skeleton of the complex of curves is known as the curve graph and is denoted by $\mathcal{C}(S_g)$. Although the coarse geometry of $\mathcal{C}(S_g)$ has been well-explored, its local geometry remains relatively unexplored owing mostly to the fact that $\mathcal{C}(S_g)$ is a locally infinite graph. In particular, little is known about curves at a distance ≥ 4 on $\mathcal{C}(S_g)$. In this talk, we will look at a family of pair of curves on S_g which are at a distance 4 apart on $\mathcal{C}(S_g)$. As an application, we will deduce an upper bound on the minimal intersection number of distance 4 curves on S_g . Finally, we give an example of a pair of curves on $\mathcal{C}(S_2)$ which are at a distance 5 apart.