

A complexity of open book decompositions and the arc complex

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J. Hempel defined a complexity of a Heegaard splitting of a closed orientable 3-manifold by using a distance of the curve complex of the splitting surface. Based on his work, we define the "translation distance" of an open book decomposition of a closed orientable 3-manifold, which is the minimum distance between any vertex and its image under the monodromy map in the arc complex of the fiber surface.

We will show that the translation distance of an open book decomposition which is a Murasugi sum of two open book decompositions is bounded above by 2, and which admits Stallings twist on the fiber surface is bounded above by 3, while we can see that there are open book decompositions with a given fiber surface which have an arbitrary high translation distance.

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