

In 1970's the mapping class group of a surface was classified by Thurston. The mapping class group of a surface can be classified into periodic, reducible, or pseudo-Anosov. Among them, we are interested in pseudo-Anosov homeomorphisms. An orientation preserving homeomorphism h of a surface is called *pseudo-Anosov* if there is a pair of transversely measured foliations \mathcal{F}^u and \mathcal{F}^s in the surface such that h stretches along \mathcal{F}^u by a constant factor $\lambda > 1$ and contracts along \mathcal{F}^s by $1/\lambda$. We call λ the *dilatation* of h . We will show how we can compute the minimal dilatation of a genus two surface and hence the length of the systole for the genus two moduli space.