

HOMEWORK SET 5
SPRING 2020

INSTRUCTOR: YI LIU

* *Due Thursday April 30, 2020.*

1. For any hyperbolic 3-manifold M of finite volume, show that there are finitely many conjugacy classes of subgroups of $\pi_1(M)$ isomorphic to $\mathbb{Z} \times \mathbb{Z}$.
2. For any value $V > 0$, show that there are at most finitely many hyperbolic 3-manifolds which are mutually non-isomorphic and which all have volume V .
3. For any integer $n > 0$, construct n hyperbolic 3-manifolds which all have the same volume but which are mutually non-homeomorphic.