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Genus one fibered knots in lens spaces

Dedicated to Professor Junzo Tao on his 60th birthday

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Let M be an orientable closed 3-manifold and K a tame knot in M. We say that K is a fibered knot if $\mathrm{Cl}(M-N(K))$ is a fiber bundle over S^1 whose fiber is an orientable closed surface with one hole and a fiber intersects a meridian of K in a single point, where $N(K)$ is a regular neighborhood of K and $\mathrm{Cl}(\cdot)$ is the closure. In particular, we say that K is a genus one fibered knot if the fiber is a torus with one hole. Hereafter we call it GOF-knot for brevity. Then it was showed in [**3**] and [**6**] by Burde, Zieschang and González-Acũna that S^3 contains just two GOF-knots, those are the trefoil knot and the figure eight knot.

In this paper we will determine GOF-knots in some lens spaces and show existences of lens spaces containing no GOF-knots. In fact, we have the following results.

PROPOSITION 1. *Let m be a non-negative integer and $L(m, 1)$ a lens space of type $(m, 1)$, where $L(0, 1)=S^2\times S^1$ and $L(1, 1)=S^3$. Then $L(m, 1)$ contains at least two* GOF*-knots K_1 and K_2 illustrated in Figure* 1 *with a fiber surface as drawn, where ${}_m\bigcirc$ means a surgery description of $L(m, 1)$. The orientation is given in Figure* 1. *The monodromy of K_1 is presented by $\begin{pmatrix} m+2 & -1 \\ 1 & 0 \end{pmatrix}$ and the*

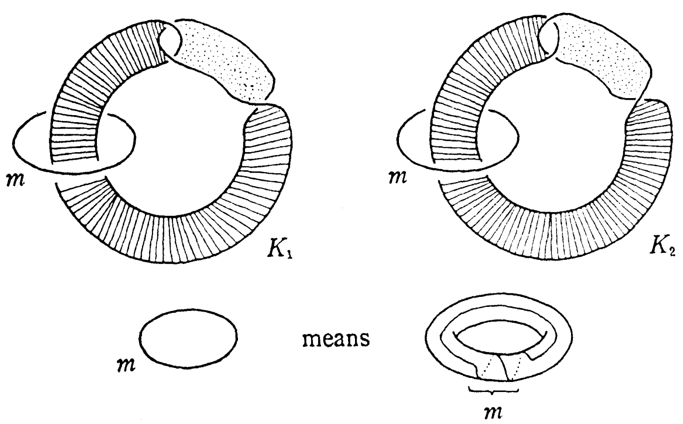

Figure 1.