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KNOTTING TRIVIAL KNOTS AND RESULTING KNOT TYPES

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Let (V, K) be a pattern (i.e. V is a standardly embedded solid torus in oriented S^3 and K is a knot in V) and f an orientation preserving emdedding from V into S^3 such that $f(V)$ is knotted.

In this paper answers to the following questions will be given depending upon whether the winding number of K_2 in V is zero or not.

(1) Suppose that K_1 is unknotted and K_2 is knotted in S^3. Can $f(K_1)$ be ambient isotopic to $f(K_2)$ in S^3 for some embedding $f: V \hookrightarrow S^3$?

(2) Suppose that K_1 and K_2 are both unknotted in S^3. How are (V, K_1) and (V, K_2) related if $f(K_1)$ is ambient isotopic to $f(K_2)$ in S^3 for some embedding $f: V \hookrightarrow S^3$?

1. Introduction. Let K be a knot in S^3, which is contained in a standardly embedded solid torus V ($\subset S^3$). Assume that K is not contained in a 3-ball in V. Let f be an orientation preserving embedding from V into S^3 such that $f(C)$ is knotted in S^3, here C denotes a core of V. Then we get a new knot $f(K)$ in S^3 called a satellite knot with a companion knot $f(C)$. The knot K is called a preimage knot and we call the pair (V, K) a pattern (see Figure 1 on the next page).

Throughout this paper for an embedding f from V into S^3, we assume that it is orientation preserving and $f(C)$ is knotted in S^3.

We concern ourselves with the following questions.

(1) Suppose that K_1 is unknotted and K_2 is knotted in S^3. Can $f(K_1)$ be ambient isotopic to $f(K_2)$ in S^3 for some embedding $f: V \hookrightarrow S^3$?

(2) Suppose that K_1 and K_2 are both unknotted in S^3. How are (V, K_1) and (V, K_2) related if $f(K_1)$ is ambient isotopic to $f(K_2)$ in S^3 for some embedding $f: V \hookrightarrow S^3$?

For two knots K_1 and K_2, we write $K_1 \cong K_2$ provided that there exists an orientation preserving self-homeomorphism of S^3 carrying K_1 to K_2 (or equivalently, K_1 and K_2 are ambient isotopic in S^3). For two patterns (V, K_1) and (V, K_2), if there exists an orientation preserving self-homeomorphism h of V sending *longitude* to