POLYNOMIAL REPRESENTATION OF STRONGLY INVERTIBLE KNOTS AND STRONGLY NEGATIVE AMPHICHEIRAL KNOTS

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It has been proved that every smooth knot in S^3 is isotopy equivalent to the closure of the image of an embedding $\phi : \mathbf{R} \mapsto \mathbf{R}^3$ defined by $\phi(t) = (f(t), g(t), h(t))$ where $f(t)$, $g(t)$ and $h(t)$ are polynomials over the field of real numbers $\mathbf{R}$. In fact any two such polynomial embeddings representing the same knot-type can be joined by a polynomial isotopy. In 1992, Shastri constructed polynomial embeddings which represents the trefoil knot and the figure eight knot respectively. Later, we could find a general procedure to construct a polynomial embedding representing any torus knot of type (p, q). After observing the pattern of these polynomial embeddings Kawauchi made the following two conjectures:

(1) Every strongly invertible knot can be represented by a polynomial embedding $t \mapsto (f(t), g(t), h(t))$ where among $f(t)$, $g(t)$ and $h(t)$, two of them must be odd polynomials and one must be an even polynomial.

(2) Every Strongly negative amphicheiral knot can be represented by a polynomial embedding $t \mapsto (f(t), g(t), h(t))$ where all three polynomials $f(t)$, $g(t)$ and $h(t)$ must be odd polynomials.

In this talk we will prove that both the conjectures are true and present some examples of such embeddings.

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