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The Hexatangle II

A tangle is a pair (B, A), where B is the 3-sphere with the interiors of a finite number of 3-balls removed, and A is a disjoint union of properly embedded arcs in B such that A meets each component of ∂B in four points. The Hexatangle is a certain tangle having six boundary components and a projection into the plane with no crossings. By filling the boundary components of a tangle with rational tangles we get knots and links in the 3-sphere. In a previous work we determined all the integral fillings on the hexatangle that produce the trivial knot. Now we consider arbitrary rational fillings of the hexatangle, and have a conjecture which says exactly when we can get the trivial knot. We show some partial results about this conjecture. The double branched cover of the hexatangle is a certain hyperbolic link L of six components in S^3. Our problem is equivalent to determining all Dehn surgeries on L that produce the 3-sphere. This link is interesting, for infinitely many hyperbolic knots which have exceptional surgeries are obtained by performing surgery on 5 components of L, and then a solution of the conjecture will lead to a listing of all such knots that are obtained from L.

This is joint work with Lorena Armas-Sanabria.