Towards surgery presentations of metabelian coloured knots and their covering links

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Abstract. A knot K and a representation ρ from its knot group onto a finite permutation group G together define a 3-manifold $M_{(K,\rho)}$ via the covering space construction. A surgery presentation for $M_{(K,\rho)}$ would in principle allow us to examine invariants of $M_{(K,\rho)}$ and of (K,ρ) which are constructed via surgery, such as analogues to the Alexander polynomial and Casson invariant. We address the problem of finding surgery presentations for $M_{(K,\rho)}$ when G is a metabelian group which is the semidirect product of a cyclic group with a finite number of copies of the cyclic group Z_p for some prime p, through an approach based on a choice of band projection of K. This approach is effective when $G = D_{2p} = Z_2 \times Z_p$ and when $G = A_4 = Z_3 \times (Z_2 \times Z_2)$. This is work in progress, joint with Andrew Kricker.