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Heegaard complexity and Matveev complexity of compact 3-manifolds

Abstract: We deal with Matveev complexity of compact orientable 3-manifolds represented via Heegaard diagrams. The definition of modified Heegaard complexity of Heegaard diagrams and manifolds will be given, and a comparison with Matveev complexity will be shown. As a relevant example, a class of manifolds which are generalizations of Dunwoody manifolds (including cyclic branched coverings of two-bridge knots and links, torus knots, some pretzel knots, and some theta-graphs) will be introduced. Upper bounds for their Matveev complexity, which linearly depend on the order of the covering, will be presented, via modified Heegaard complexity. Also some lower bounds will be provided, using homology arguments.