

Abstract

The study of invariants in Low-Dimensional Topology has undergone dramatic progress in the recent years. One important topic is the “categorification” of polynomial invariants, as exemplified by Khovanov’s categorification of the Jones polynomial. Another important progress came from Heegaard Floer homology due to Ozsváth and Szabó. Motivated by the generalisation of the Jones polynomial to knots in arbitrary manifolds, the study of skein modules became very interesting. Turaev-Viro invariants found applications not only in the study of 3- and 4-dimensional manifolds, but even in Combinatorial Group Theory (Andrews-Curtis conjecture).

Some of the new invariants are defined combinatorially, some are defined using analytic structures. In spite of the different nature of their definition, some relations between them had been found, and there still seems to be more hidden relations whose exploration would be very promising. There is also need to develop more tools for the practical computation of the new invariants.