Using computers to research Knot Theory

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I am interested in using computers to research knot theory. Motivated by some results of A'Campo, Ishikawa and W Gibson which make known the Gordian unknotting numbers of knots related to certain classes of divides, I wrote software to tabulate generically immersed intervals of divides. I wrote a paper jointly with W Gibson about this ('Automatic Tabulation of Generically Immersed Intervals and Their Associated Links', A Gibson, W Gibson, Interdisciplinary Information Sciences, Vol. 9, No. 1, pp. 141-155 (2003)).

I am currently studying the asymptotic behaviour of the Coloured Jones Polynomials of knots in relation to the Volume Conjecture. The Volume Conjecture was proposed by Kashaev and generalized by H Murakami and J Murakami. It states that the series of evaluations of the polynomials, evaluated at the N-th root of unity, grow exponentially and that the growth rate is related to the volume of the hyperbolic parts of the complement of a knot. I am using Pari-GP software to examine asymptotic behaviour of the series of certain evaluations of the Coloured Jones Polynomials of the figure-eight knot. I would like to determine when those series converge and calculate the limit when it exists.

In general, closed formulas for the Coloured Jones Polynomials for a given knot are not known. In the future I am interested in trying to find such formulas. I am interested in studying the asymptotic behaviour of the Coloured Jones Polynomials of other knots. I am also interested in other knot theory problems which can be examined using computers.