

## Some suggestions for reading about knots and links

Comment: This is a 'getting started' list. The references below all have their own references, that will take you in many directions.

### 1. Readings for the non-specialist

- (a) Hoste, Thistlethwaite and Weeks, *The First 1,701,936 Knots*, Scientific American, 20, No. 4, 1998. A delightful article which conveys much about the state of knowledge in 1999 about knot classification, by describing how the three authors accomplished their enormous task of classifying knots up to 16 crossings.
- (b) Artin, E., *The Theory of Braids*, American Scientist, 38, 1950, pp. 112-119. A delightful and very accessible article on an aspect of knot theory which has become very important in all areas of mathematics. Passages from this article were used in the GRE exams in the mid 1950's! Directed at an audience of non-mathematicians.
- (c) Lickorish and Millett, *The New Polynomial Invariant of Knots and Links*, Mathematics Magazine, 61, No. 1, February 1988. The authors were awarded the Chauvenet Prize for "Expository Writing" by the MAA, for this article. It's at a level which is accessible to bright high school students.
- (d) Livingston, *Knot Theory*, MAA Carus Monographs No. 24, 1993. A survey, directed at mathematicians with backgrounds in other areas. Not a textbook. Clear, and a good guide to further reading.
- (e) Kauffman, L. *States Models and the Jones Polynomial*, Topology, 26, 1987, 395-407. An important research article which can be read with a minimum of background in the subject.
- (f) Sumners, D.W. *The Role of Knot Theory in DNA Research*, 297-317, Geometry and Topology, Editors McCrory and Shifrin, Marcel Decker 1987. A talk given to a group of mathematicians at a recent conference, to tell them about problems which are of interest to biologists. It contains a useful "dictionary" to translate the lingo of chemistry and biology into mathematical terms. It also has references, if you want to learn more about the biology.

### 2. Readings for Mathematics graduate students or upper level undergrads

- (a) Rolfsen, D. *Knots and Links*, Publish or Perish, 1978. A graduate textbook on knot theory, out of date, but excellent.
- (b) Hempel, John *3-manifolds*, Annals of Math Studies #86, Princeton University Press 1976. Very basic stuff.
- (c) Prasolov, V.V. and Sossinsky, A.B. *Knots, Links, Braids and 3-manifolds*, AMS Translations of Mathematical Monographs 154, 1996.

- (d) Saveliev, Nikolai, *Lectures on the topology of 3-manifolds: an introduction to the Casson invariant*, deGruyter 1996.
- (e) Manturov, Vassily, *Knot Theory*, Chapman and Hall 2004.
- (f) Scott, Peter, *The Geometry of 3-Manifolds*, Bull. London Math. Soc. **15**, 1983, 401-487.
- (g) Birman, J.S. *New points of view in knot and link theory*, Bull. AMS APRIL 1993, A survey article on the state of the art as regards finite type invariants, in 1993. Directed at an audience of graduate students and research mathematicians. Won the Chauvenet Prize.