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Membership of academic societies:

The Mathematical Society of Japan

Research Interest:

- Knot theory
- Low dimensional topology

Research Summary:

Knot theory is a field of geometry and topology, where we are interested in the complexity of knots or links, i.e. simple closed curves in the space. Such complexity is expressed as numbers, polynomials, etc. We call these values by invariants of knots or links. I mainly research the between link diagrams and link invariants, for example, the number of crossing changes needed to unknot the given link. It is amazing that a lot of seemingly easy formulas are proved using advanced theories as singularity theory, contact geometry, gauge theory, or Khovanov homology theory.

Recently, many researchers are interested in the relations between knot theory and the other theory: representation theory, number theory, chemistry, biology, etc. It is hard to catch up with such researches, though I am looking forward to further evolution.

Major Publications:

- [1] T. Kawamura, On unknotting numbers and four-dimensional clasp numbers of links, Proc. Amer. Math. Soc. **130** (2002), no. 1, 243–252.
- [2] T. Kawamura, Relations among the lowest degree of the Jones polynomial and geometric invariants for a closed positive braid, Comment. Math. Helv. **77** (2002), no. 1, 125–132.
- [3] T. Kawamura, Quasipositivity of links of divides and free divides, Topology Appl. **125** (2002), no. 1, 111–123.
- [4] T. Kawamura, Links associated with generic immersions of graphs, Algebr. Geom. Topol. **4** (2004), 571–594.
- [5] T. Kawamura, The Rasmussen invariants and the sharper slice-Bennequin inequality on knots, Topology **46** (2007), no. 1, 29–38.

Awards and Prizes:

- 2003, MSJ Takebe Katahiro Prize for Encouragement of Young Researchers, Research on divide knots and four-dimensional estimates of unknotting numbers

Education and Appointments:

- 2000 Ph.D. in Mathematical Sciences, the University of Tokyo
- 2000 JSPS Research Fellowship, the University of Tokyo
- 2002 Research Associate, Aoyama Gakuin University
- 2007 Associate Professor, Nagoya University

Message to Prospective Students:

The students of the small group class I take charge of usually read textbooks on basic course of knot theory and low dimensional topology. Here is examples:

- [1] V.V.Prasolov and A.B.Sossinsky, Knots, links, braids and 3-manifolds, AMS, 1997.
- [2] J.M.Lee, Introduction to topological manifolds, Springer, 2000.
- [3] L.H.Kauffman, Formal knot theory, Dover Publications, 2006.
- [4] A.Hattori, Topology (Japanese), Iwanami Shoten, 1991.

I expect you to decide the theme of master's thesis by yourself reading many articles where some errors or omissions exist occasionally. If you would like to start the study of knot theory quickly, I recommend you to learn fundamental group and homology from textbook on beginning of topology in advance. I will also support your careful study on these.

I believe that you, a graduate student of Nagoya University, can manage to solve difficult problems and be glad to go a step further.