

Enumerating prime links by a canonical order

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This work is a joint work with A. Kawauchi. A well-order (called a *canonical order*) was introduced in the set of (unoriented) links by A. Kawauchi [K] (see also A. Kawauchi and I. Tayama [KT]). This well-order also naturally induces a well-order in the set of closed connected orientable 3-manifolds and suggests a method for enumerating the prime links and the 3-manifolds.

We assign to every link a lattice point whose length is equal to the minimal crossing number on closed braid forms of the link and we call the number the *length* of the link. We note that a link L is smaller than a link L' in the canonical order if the length of L is smaller than that of L' , and for any natural number n there are only finitely many, uniquely ordered links with lengths up to n .

In this talk, we give a way to enumerate the prime links by the canonical order and show a table of the prime links with lengths up to 10. Our argument enables us to discover 7 omissions and one overlap in Conway's table of links of 10 crossings.

References

[K] A. Kawauchi, A tabulation of 3-manifolds via Dehn surgery, *Boletín de la Sociedad Matemática Mexicana* (to appear).

[KT] A. Kawauchi and I. Tayama, Enumerating the prime knots and links by a canonical order, in: *Proc. First East Asian School of Knots, Links, and Related Topics* (Seoul, Feb. 2004), (2004)307-316. (Online Version)<http://knot.kaist.ac.kr/2004/proceedings.php>.