Algebraic Invariants in Knot Theory
Practicals 13

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Exercise 1 (7.1.1, 7.1.6 rev). Find and prove a formula that determines the number of components of the torus link $K(q, r)$. Moreover, show that each component of the torus link $K(q, r)$ is a torus knot, and determine its parameters.

Exercise 2. Let $q, r \in \mathbb{Z}$ with $r \neq 0$ and $\gcd(q, r) = 1$.

(i) Show that if $q = 0, \pm 1$ or $r = \pm 1$, then $K(q, r)$ is the trivial knot.

(ii) Show that if q and r are not equal to 0 and ± 1 then

(a) $K(-q, r)$ is the mirror image of $K(q, r)$.

(b) $K(-q, -r)$ is the knot with opposite orientation of $K(q, r)$.

(c) $K(-q, -r)$ is equivalent to $K(q, r)$.

(d) $K(q, r)$ is an invertible knot.

Exercise 3. Prove that $K(q, r) \cong K(r, q)$ for every $q, r \in \mathbb{Z}$.