An integral invariant from the knot group

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Abstract. This is a developed version of the talk in 9 May, 2008 entitled "Numerical invariants from knot groups". Let K be a knot in S^3, $G(K)$ the knot group of K, and $G'(K)$ the commutator subgroup of $G(K)$. Then an invariant, denoted by $a(K)$, is the minimum number of elements which generate $G'(K)$ normally in $G(K)$. We named the invariant the *Ma-Qiu index* or the *MQ index* of K.

Let $K_{p,q}$ be the connected sum of the $(2, p)$-torus knot and the $(2, q)$-torus knot. Then our main theorem is that the following three statements are equivalent: (1) $\gcd(p, q) = 1$ (2) $m(K_{p,q}) = 1$ (3) $a(K_{p,q}) = 1$, where $m(K)$ is the Nakanishi index of K. We proved the equivalence of (1) and (2) by a commutative ring theoretical method, and that of (1) and (3) by a combinatorial group theoretical method.