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Commutators of cycles in permutation groups

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Abstract: We prove that for $n \geq 5$, every element of the alternating group A_n is a commutator of two cycles of A_n.

Moreover we prove that for $n \geq 2$, a $(2n + 1)$-cycle of the permutation group S_{2n+1} is a commutator of a p-cycle and a q-cycle of S_{2n+1} if and only if the following three conditions are satisfied:

(i) $n + 1 \leq p, q$,
(ii) $2n + 1 \geq p, q$,
(iii) $p + q \geq 3n + 1$.

Keywords: Commutator, cycle, permutation, alternating group.

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Komutatorji ciklov v permutacijskih grupah

Povzetek: Dokažemo, da je za $n \geq 5$ vsak element alternirajoče grupe A_n komutator dveh ciklov A_n.

Dokažemo tudi, da je za $n \geq 2$ vsak $(2n+1)$-cikel permutacijske grupe S_{2n+1} komutator p-cikla in q-cikla S_{2n+1}, če in samo če so izpolnjeni naslednji trije pogoji:

(i) $n + 1 \leq p, q,$
(ii) $2n + 1 \geq p, q,$
(iii) $p + q \geq 3n + 1.$

Ključne besede: Komutator, cikel, permutacija, alternirajoča grupa.