

## On the uniform perfectness of the commutator subgroup of some homeomorphism groups

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### Abstract

An important theorem of Ling states that if  $G$  is any factorizable non-fixing group of homeomorphisms of a paracompact space then its commutator subgroup  $[G, G]$  is perfect, that is  $[[G, G], [G, G]] = [G, G]$ . We present generalization of Ling's theorem. We prove that if  $G$  is a factorizable non-fixing group of homeomorphisms of  $X$ , commutator length  $cl_G$  is bounded on  $[G, G]$  and  $G$  is bounded with respect to all fragmentation norms then the commutator subgroup  $[G, G]$  is uniformly perfect. We have an interesting corollary from this theorem. Namely, if  $G$  is bounded factorizable non-fixing group of homeomorphisms then  $[G, G]$  is uniformly perfect.

We also present conditions ensuring that the commutator group of a homeomorphism group is uniformly simple.

Moreover we consider the case of a noncompact manifold  $M$  such that  $M$  is the interior of a compact manifold  $\bar{M}$  and groups of homeomorphisms on  $M$  with no restriction on support. Consequently such groups are not factorizable in the usual way, but only in a wider sense.

We present some examples and open problems which are of interest in the context of the our results.

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