

On profinite groups with Engel-like conditions

Raimundo de Araujo Bastos Junior*

*Universidade de Brasília, *bastos@mat.unb.br*

Resumo

The positive solution of the restricted Burnside problem had important consequences in the study of profinite groups. For example, using Wilson's reduction theorem [W], Zelmanov has been able to prove local finiteness of profinite periodic groups [Z]. Later Wilson and Zelmanov [WZ] used the result to prove that every Engel profinite group is locally nilpotent. In this work we will show certain situations where we can guarantee the local virtual nilpotency of profinite groups.

Our work is motivated by a result of Shumyatsky [S], which shows that if G is a finitely generated profinite group in which $[x_1, \dots, x_k]$ are Engel for every $x_1, \dots, x_k \in G$, then the k th term of the lower central series $\gamma_k(G)$ is locally nilpotent.

In this work we will discuss the following results:

Theorem A. ([BS]). *Let G be a profinite group in which for every element $x \in G$ there exists a natural number $q = q(x)$ such that x^q is Engel. Then G is locally virtually nilpotent.*

Theorem B. ([BS]). *Let p be a prime and G a finitely generated profinite group in which for every γ_k -value $x \in G$ there exists a natural p -power $q = q(x)$ such that x^q is Engel. Then $\gamma_k(G)$ is locally virtually nilpotent.*

Referências

- [BS] R. Bastos and P. Shumyatsky, On profinite groups with Engel-like conditions, (submitted).
- [S] P. Shumyatsky, On profinite groups in which commutators are Engel. *J. Aust. Math. Soc.* **70** (2001), no. 1, 1–9.
- [W] J.S. Wilson, *On the structure of compact torsion groups*, *Monatshefte für Mathematik*, **96** (1983), 57–66.

- [WZ] J. S. Wilson and E. I. Zelmanov, Identities for Lie algebras of pro- p groups, *J. Pure Appl. Algebra*, **81** (1992) 103–109.
- [Z] E. I. Zelmanov, *On periodic compact group*, Israel J. Math., **77** (1992), 83–95.