Seminário de Álgebra

Nilpotency of the verbal subgroup corresponding to the Engel word in residually finite groups

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Abstract.
A group-word is a non trivial element $w = w(x_1, \dots, x_s)$ of the free group F on free generators $x_1, \dots, x_s$. An example of group-word is the Engel word, that is a word w in two variables x, y such that

$$w = w(x, y) = [x, {}_s y] = [x, \underbrace{y, \dots, y}_{s\ times}]$$

for some positive integer s. Given a group G, a group-word $w = w(x_1, \dots, x_s)$ can be seen as a function defined in the cartesian product G^s taking values in G, and the subgroup of G generated by all w-values is denote by $w(G)$ and it is called the *verbal subgroup of G corresponding to w*.

In 2014 B. Baumslag and J. Wiegold [1] established that the following property characterizes the nilpotency of a finite group G when $w = x$:

P: "If a and b are w-values of coprime orders $|a|$ and $|b|$, respectively, then the order of ab is the product of $|a|$ and $|b|$".

Later in 2017 R. Bastos, C. Monetta and P. Shumyatsky proved that P characterizes the nilpotency of $w(G)$ when w is a lower central word and G is a finite group (see [2]). Going further, one could ask what happens for other group-words.

The aim of this talk is to discuss the property P when w is the Engel word and G is a residually finite group.

References

[1] B. Baumslag and J. Wiegold, *A Sufficient Condition for Nilpotency in a Finite Group*, preprint available at arXiv:1411.2877v1 [math.GR].

[2] R. Bastos, C. Monetta and P. Shumyatsky, *A Criterion for Metanilpotency of a finite group*, preprint available at doi.org/10.1515/jgth-2018-0002.