LEFT 3-ENGEL ELEMENTS IN GROUPS

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An element x in a group G is a left Engel element if for each $x \in G$ there exists a positive integer $n = n(x)$ such that

$$[[[g, \underbrace{x], x], \cdots, x}_{n}] = 1.$$

If $n = n(x)$ can be chosen independently of x, then we say that x is a left n-Engel element. There are some connections to groups of prime power exponent and for example, every element in a group of exponent 3 is a left 2-Engel element. Whereas it is easy to see that the normal closure of a left 2-Engel element is abelian, it is still an open question whether the normal closure of a left 3-Engel element is locally nilpotent. We will give some overview of this problem, focusing on advances in recent years.