

Gaps in probabilities of satisfying some commutator identities

Primož Moravec

Fakulteta za matematiko in fiziko

Univerza v Ljubljani

Jadranska 21 SI-1000 Ljubljana, Slovenia

`primoz.moravec@fmf.uni-lj.si`

Let w be a non-trivial word in a free group of rank d and $w : G^d \rightarrow G$ a corresponding word map on a finite group G . Let $P_{w=1}(G) = |w^{-1}(1)|/|G|^d$ be the probability that a randomly chosen d -tuple of elements of G evaluates to 1 under the map w . There is an old result of Gustafson stating that if G is a finite non-abelian group, then the commuting probability $P_{[x,y]=1}(G)$ is bounded above by $5/8$. Dixon (2004) posed a question whether or not there exists a constant $\eta < 1$ depending on w only such that for every finite group G not satisfying the law $w = 1$ we have that $P_{w=1}(G) \leq \eta$. We answer the question affirmatively for the 2-Engel word $w = [x, y, y]$ and metabelian word $w = [[x, y], [z, w]]$.

This is joint work with Costantino Delizia and Chiara Nicotera (University of Salerno, Italy), and Urban Jezernik (University of the Basque Country, Spain).