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Michael J. Mossinghoff* (mimossinghoff@davidson.edu), Davidson College, Davidson, NC 28035, **Dilum De Silva**, Bowling Green State University Firelands, Huron, OH 44839, **Vincent Pigno**, California State University, Sacramento, CA 95819, and **Christopher Pinner**, Kansas State University, Manhattan, KS 66506. *The Lind-Lehmer constant for certain p -groups.*

In 2005, Lind formulated an analogue of Lehmer's well-known problem regarding the Mahler measure for general compact abelian groups, and defined a Lehmer constant for each group. Since then, this Lind-Lehmer constant has been determined for many finite abelian groups, including all but a thin set of finite cyclic groups. We establish some new congruences satisfied by the Lind Mahler measure for finite p -groups, and use them to determine the Lind-Lehmer constant for many groups of this form. We also develop an algorithm that determines a small set of possible values for a given p -group of a particular form. This method is remarkably effective, producing just one permissible value in all but a handful of trials. This leads to some questions regarding the size of the smallest nontrivial $(p - 1)$ st root of unity mod p^r . (Received September 24, 2017)