1069-20-163 **Jason Shaw*** (jshaw10@stmarytx.edu), Department of Mathematics, One Camino Santa Maria, San Antonio, TX 78228. *Commutator relations and the clones of finite groups.*

Let $G$ be a group, and let $\mathrm{Clo}(G)$ denote the clone of $G$. We want to examine the following question: Does there exist an integer $k > 0$ such that for *all* groups $G$ the clone of $G$ is determined by the subgroups of $G^k$? By 'determined' we mean that an operation $f \in \mathrm{Clo}(G)$ if and only if $f$ preserves the subgroups of $G^k$. To examine this question the idea of a commutator relation for groups is extended to a higher order commutator relation for groups. We employ these higher order commutator relations for groups to study the clones of the dihedral 2-groups $D_{2^n}$, where $n$ is an integer, $n \geq 3$. In so doing, we conclude that the smallest positive integer $k(n)$ such that $\mathrm{Clo}(D_{2^n})$ is determined by the subgroups of $(D_{2^n})^{k(n)}$ satisfies the inequality $n < k(n) \leq 2^{n-1}$, a number that grows without bound as $n \to \infty$. Hence, we are able to prove that there does not exist an integer $k > 0$ such that for all groups $G$ the clone of $G$ is determined by the subgroups of $G^k$.

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