1043-20-187 **Viji Z Thomas*** (`vthomas@math.binghamton.edu`), Department of Mathematical Sciences, Binghamton University, Binghamton, NY 13902-6000. *The non-abelian tensor product of finite groups is finite: a homology free proof.*

Let $G$ and $H$ be groups which act on each other via automorphisms and which act on themselves via conjugation. The actions of $G$ and $H$ are said to be compatible, if ${}^{{}^h g}h' = {}^{hgh^{-1}}h'$ and ${}^{{}^g h}g' = {}^{ghg^{-1}}g'$ for all $g, g' \in G$, $h, h' \in H$. The non-abelian tensor product $G \otimes H$ is defined provided $G$ and $H$ act compatibly. In such a case $G \otimes H$ is the group generated by the symbols $g \otimes h$ with relations $gg' \otimes h = ({}^g g' \otimes {}^g h)(g \otimes h)$ and $g \otimes hh' = (g \otimes h)({}^h g \otimes {}^h h')$ , where ${}^g g' = gg'g^{-1}$ and ${}^h h' = hh'h^{-1}$. In their 1987 paper, *Some computations of non-abelian tensor products of groups*, Brown, Johnson and Robertson mention eight open problems. The first problem is phrased as follows: Let G and H be finite groups acting compatibly on each other. Then is it true that $G \otimes H$ is finite? In the same year, G. J. Ellis answered the question in the affirmative using homological methods. Brown, Johnson and Robertson add that no purely algebraic proof is known. In this talk I will present a homology free and purely group theoretic proof that the non-abelian tensor product of two finite groups is finite. (Received August 26, 2008)