Meeting: 998, Houston, Texas, SS 11A, Special Session on Algebraic Topology

998-55-411 **F. R. Cohen*** (cohf@math.rochester.edu), **B. Farb** (farb@math.uchicago.edu) and **J. Pakianathan** (jonpak@math.rochester.edu). *On the IA-automorphisms of a free group.* Preliminary report.

Let IA_n denote the subgroup of the automorphism group $\mathrm{Aut}(F_n)$ of a free group on n-letters F_n given by those automorphisms which induce the identity map on the level of the abelianization of F_n. Let $\chi(n)$ denote McCool's subgroup of $\mathrm{Aut}(F_n)$ given by the basis conjugating automorphisms of F_n. Let $\chi(n,+)$ denote the subgroup of $\chi(n)$ generated by the "upper triangular" basis conjugating isomorphisms of F_n.

Theorem 1: The classifying space of $\chi(n,+)$ is a stable retract of the classifying space of $\chi(n)$. Thus the integral cohomology of $\chi(n,+)$ with Euler-Poincaré series $(1+t)(1+2t)\cdots(1+(n-1)t)$ is a direct summand of that of $\chi(n)$, and the cohomology of IA_n surjects to that of $\chi(n,+)$.

Theorem 2: The Lie algebra obtained from the descending central series of $\chi(n,+)$ is presented as a quadratic Lie algebra, a free Lie algebra modulo quadratic relations analogous to the infinitesimal braid relations of T. Kohno, Falk, and Randall.

In addition, a homological obstruction theory is set up to measure when a homomorphism $g: F_n \to F_n$ which induces the identity on homology is, in fact, an epimorphism, and thus an isomorphism. (Received March 02, 2004)