Meeting: 999, Nashville, Tennessee, SS 5A, Special Session on Topological Aspects of Group Theory

999-20-106 **Kenneth S. Brown*** (kbrown@math.cornell.edu), Department of Mathematics, Malott Hall, Cornell University, Ithaca, NY 14853. *The homology of Richard Thompson's group F.* Preliminary report.

Let F be Thompson's group, with presentation $\langle x_0, x_1, x_2, \ldots ; x_n^{x_i} = x_{n+1} \text{ for } i < n \rangle$. Geoghegan and I calculated $H_*(F)$ as a graded abelian group in the early 1980s: $H_n(F)$ is free abelian of rank 2 for all $n \geq 1$. It turns out that the homology admits a natural ring structure, which I calculated a few years later but never published. The answer is that $H_*(F)$ is an associative ring (without identity) generated by an element e of degree 0 and elements α, β of degree 1, subject to the following relations: $e^2 = e$, $e\alpha = \beta e = 0$, $\alpha e = \alpha$, and $e\beta = \beta$. It follows that $\alpha^2 = \beta^2 = 0$ and that the alternating products $\alpha\beta\alpha\cdots$ and $\beta\alpha\beta\cdots$ give a basis in positive dimensions. With the aid of this ring structure one can also calculate the cohomology ring: $H^*(F) \cong \bigwedge(a, b) \otimes \Gamma(u)$, where $\Gamma(u)$ is a divided polynomial ring on one generator u of degree 2.

In this talk, which is dedicated to Ross Geoghegan in honor of his 60th birthday, I will explain where the ring structure comes from and describe the method of calculation. (Received August 16, 2004)