Meeting: 999, Nashville, Tennessee, SS 6A, Special Session on Local and Homological Algebra

999-13-240 **Andrew R. Kustin*** (kustin@math.sc.edu), Mathematics Department, University of South Carolina, Columbia, SC 29208, and **Jerzy M. Weyman**, Mathematics Department, Northeastern University, Boston, MA 02115. *Resolutions of Universal rings.*

Fix positive integers e, f, and g, with $f - e \geq 1$ and $r_0 = g - f + e \geq 0$. Hochster established the existence of a commutative noetherian ring R and a universal resolution

$$\mathbb{U}: \quad 0 \to R^e \to R^f \to R^g$$

such that for any commutative noetherian ring S and any resolution

$$\mathbb{V}: \quad 0 \to S^e \to S^f \to S^g,$$

there exists a unique ring homomorphism $R \to S$ with $\mathbb{V} = \mathbb{U} \otimes_R S$. The present talk concerns the universal ring R when $r_0 = 0$. Write $\mathbb{U}$ in the form

$$0 \to E \to F \to G.$$

Let P be the polynomial ring $S(E \otimes F^*) \otimes S(F \otimes G^*)[\mathfrak{b}]$, where $\mathfrak{b}$ is the Buchsbaum-Eisenbud multiplier which occurs in this situation. Let k be a field. The graded betti numbers of $k \otimes R$ as a $k \otimes P$-module depend on the characteristic of k. We give the minimal resolution of $k \otimes R$ as a $k \otimes P$-module when k has characteristic zero. The resolution is expressed in terms of the Schur and Weyl modules of E, F, and G. (Received August 24, 2004)