1041-16-183 **Ellen E. Kirkman*** (kirkman@wfu.edu), Department of Mathematics, Box 7388, Wake Forest University, Winston-Salem, NC 27109, **James J. Kuzmanovich** (kuz@wfu.edu), Department of Mathematics, Box 7388, Wake Forest University, Winston-Salem, NC 27109, and **James J. Zhang** (zhang@math.washington.edu), Department of Mathematics, Box 354350, University of Washington, Seattle, WA 98195. *Gorenstein Invariant Subrings of Regular Algebras under Hopf Algebra Actions.*

Watanabe's Theorem states that if a finite group G acts on a commutative polynomial ring $A = k[V]$ as elements of $\mathrm{SL}_n(V)$, then the ring of invariants A^G is a Gorenstein ring. We consider generalizations of this theorem in the setting where the group algebra kG is replaced by a finite dimensional semi-simple Hopf algebra H, and A is a noetherian Artin-Schelter regular algebra that is an H-module algebra, with each homogeneous component A_j an H-module. Defining an extension of Jorgensen and Zhang's notion of the homological determinant of a group action to Hopf algebra actions, we prove the following generalization of Watanabe's Theorem:

Theorem. If the homological determinant of the H-action on A is trivial, then the invariant subring A^H is an Artin-Schelter Gorenstein ring.

Examples of Hopf algebra actions on regular algebras are also presented. (Received August 11, 2008)