1004-20-48 **Chal Benson*** (`bensonf@mail.ecu.edu`), Departmant of Mathematics, East Carolina University, Greenville, NC 27858, and **R. Michael Howe** and **Gail Ratcliff**. *Some invariant polynomials of a matrix argument.* Preliminary report.

This work concerns linear multiplicity free actions of the complex groups $G_{\mathbb{C}} = GL(n, \mathbb{C})$, $GL(n, \mathbb{C}) \times GL(n, \mathbb{C})$ and $GL(2n, \mathbb{C})$ on the vector spaces $V = Sym(n, \mathbb{C})$, $M_n(\mathbb{C})$ and $Skew(2n, \mathbb{C})$. We relate the canonical invariants in $\mathbb{C}[V \oplus V^*]$ to spherical functions for Riemannian symmetric pairs (G, K) where $G = GL(n, \mathbb{R})$, $GL(n, \mathbb{C})$ or $GL(n, \mathbb{H})$ respectively. These in turn can be expressed using three families of classical zonal polynomials. We use this fact to derive a combinatorial algorithm for the generalized binomial coefficients in each case. Many of these results were obtained previously by Knop and Sahi using different methods. (Received January 11, 2005)