1026-12-43   **Thomas W. Cusick**, **Yuan Li** and **Pante Stanica*** (`pstanica@nps.edu`), Naval Postgraduate School, Applied Mathematics Department, Monterey, CA 93943. *Counting Balanced Polynomials over Finite Fields.*

Under mild conditions on n, p, we give a lower bound on the number of n-variable balanced symmetric polynomials over finite fields $GF(p)$, where p is a prime number. The existence of nonlinear balanced symmetric polynomials is an immediate corollary of this bound. Furthermore, we conjecture that $X(2^t, 2^{t+1}l - 1)$ are the only nonlinear balanced elementary symmetric polynomials over $GF(2)$, where $X(d, n) = \sum_{i_1 < i_2 < \cdots < i_d} x_{i_1} x_{i_2} \cdots x_{i_d}$, and we prove various results in support of this conjecture. (Received January 25, 2007)