Let $V$ be a real Euclidean space, and $W \subseteq O(V)$ a finite reflection group. We denote by $S$ the set of polynomial functions on $V$. Then $W$ naturally acts on $S$. It is well known that the subalgebra of $S$ consisting of invariant polynomials is generated by $n$ algebraically independent homogeneous polynomials. A system of such generators is called a system of basic invariants.

A canonical system of basic invariant was introduced by Flatto and Wiener for solving a mean value problem related with the $W$-orbit of a point in $V$. It is known that there exists a canonical system for all finite real reflection groups. Iwasaki determined the structure of the vector space consisting of real valued continuous functions satisfying the mean value property on a regular convex polytope. Explicit formulas of canonical systems play an important part in the proof by Iwasaki. Explicit formulas of canonical systems of types A, B, D, F, H and I are already given. That problem of type E is still opened.

In this talk, we will give a construction for the explicit formulas of canonical systems. The construction does not depend on the classification of finite irreducible reflection groups. This is based on a joint work with S. Tsujie. (Received September 14, 2013)