1096-13-673 **Hongbo Li*** (hli@mmrc.iss.ac.cn), Academy of Mathematics and Systems Science, C, Beijing, Beijing 100190, Peoples Rep of China, and **Changpeng Shao** and **Lei Huang**. *The Gröbner Basis Theory of Bracket Polynomials.*

In classical invariant theory, a bracket is the determinant of the coordinates of n vectors in an nD vector space, and all invariants under $GL(n)$ are polynomials of the brackets, called bracket polynomials.

While addition and multiplication among bracket polynomials are easy when the input and output are both in normal form, division of a bracket polynomial by another, or more generally, by finitely many bracket polynomials, is highly nontrivial. The division requires both the quotient(s) and the remainder to be bracket polynomials, and the order of the remainder to be not higher than the input bracket polynomial. The division is indispensible for obtaining invariant results by algebraic manipulations among classical invariants.

In this talk, we introduce our recent work of establishing the Gröbner basis theory of bracket polynomials. We start with a discovery of an admissible order among bracket monomials, i.e., if $f \prec g$ then $fh \prec gh$ for nonzero f, g, h. Then we proceed to define the division operation among bracket polynomials. And then we investigate the least common multipliers of two bracket polynomials, which turn out to be not unique but finite. With these preparations we are able to establish the Buchberger algorithm for bracket polynomials. (Received September 09, 2013)