1037-14-162   **Shaowei Lin*** (`shaowei@gmail.com`), University of California, Berkeley, Department of Mathematics, 970 Evans Hall #3840, Berkeley, CA 94720-3840. *Relations among Principal Minors of a Matrix.* Preliminary report.

Let P_n be the prime ideal of all polynomial relations among the principal minors of an $n \times n$ matrix. Related to the Principal Minor Assignment Problem formulated by Holtz and Schneider is the problem of finding a finite set of generators for P_n. While this elimination-type problem is in theory solvable by Göbner bases techniques, it is computationally expensive even for the case $n = 4$. For instance, hyperdeterminantal relations among the principal minors of a symmetric 4×4 matrix were discovered by Holtz and Sturmfels. In this talk, we will show how to find generators in the general 4×4 case by considering products $a_{ij}a_{jk} \cdots a_{lm}a_{mi}$ of the matrix entries called cycles. These cycles also allow us to prove that the image of the principal minor map is closed for all n. We will describe a group action on the principal minors that leaves P_n invariant, and discuss the representation theoretic consequences. (Received January 31, 2008)