1067-08-859 **Ya-lun Tsai*** (tsaix066@umn.edu). *Real root counting for parametric polynomial systems and applications to Maxwell's conjecture.*

James C. Maxwell conjectured there are at most 4 non-degenerated equilibrium points of the electric potential created by 3 point charges. Fixing a configuration that 3 point charges form, we reduce the problem to counting positive zeros of a system with 2 polynomial equations in 2 variables and 2 parameters.

Using Groebner basis to compute Hermite quadratic forms makes it possible to count positive zeros of real polynomial systems. We extend the usages of these tools to work for parametric polynomial systems. Together with Sylvester resultants and subresultant sequences, we are able to count positive zeros of our polynomial systems for all nonzero real pairs of parameters. Therefore, we prove that Maxwell's conjecture is true in the case when there are 3 point charges forming an equilateral triangle. (Received September 15, 2010)