

1106-11-659

**Robin French\*** (rfrench3@elon.edu) and **Chad Awtrey**. *A new algorithm for Galois groups of quintic polynomials.*

Finding solutions of polynomial equations is a central problem in mathematics. Of particular importance is the ability to solve a polynomial “by radicals”; i.e., using only the coefficients of the polynomial, the four basic arithmetic operations (addition, subtraction, multiplication, division), and roots (square roots, cube roots, etc.). For example, the existence of the quadratic formula shows that all quadratic polynomials are solvable by radicals. In addition, degree three polynomials and degree four polynomials are also solvable by radicals, which was shown in the 16th century. However, the same is not true for all degree five polynomials. Therefore, we are left with the following question: how do we determine which degree five polynomials are solvable by radicals? To answer this question, we study an important object that is associated to every polynomial. This object, named after 19th century mathematician Evariste Galois, is known as the polynomial’s Galois group. The characteristics of the Galois group encode arithmetic information regarding its corresponding polynomial, including whether or not the polynomial is solvable by radicals. In this talk, we will discuss a new algorithm for determining the Galois group of a degree five polynomial. (Received September 04, 2014)