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Rebecca I. Swanson* (rswanson@nebrwesleyan.edu), 5000 Saint Paul Ave., Nebraska Wesleyan University, Dept. of Mathematics and Computer Science, Lincoln, NE. *Combinatorial Proofs of Some Chromatic Polynomial Constraints*. Preliminary report.

For the past century, chromatic polynomials have been studied in depth. The problem of determining exactly which polynomials are chromatic polynomials remains an interesting open question. In 2001, Steingrímsson introduced a class of simplicial complexes called coloring complexes and showed that a quantity associated to a graph's coloring complex, called the h -vector, encodes the graph's chromatic polynomial. Since then, a mixture of topology, geometry, combinatorics, and commutative algebra has been used to study coloring complexes and provide new insights into restrictions upon chromatic polynomials. It remains to construct combinatorial proofs for these restrictions. In this talk, we shall discuss these known constraints and present combinatorial proofs of the first few as an opening step in this large open question. (Received August 23, 2011)