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Counting Acyclic Orientations of Signed Graphs

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Abstract of Report Talk: In 1995, Richard Stanley introduced the symmetric chromatic function of a graph, which is a power series in the variables $x_1, x_2, \ldots$ He then proved that when this function is written in a certain basis, the coefficients reveal information about the acyclic orientations of the graph.

The goal of our research is to generalize Stanley's result to signed graphs. A signed graph is a graph whose edges are labeled with either a plus sign or a minus sign. The definitions of graph colorings and graph orientations can be naturally modified to interact with signed edges.

Groups from previous years of the same research program successfully developed analogous symmetric chromatic functions in the variables $\ldots, x_{-2}, x_{-1}, x_0, x_1, x_2, \ldots$ for signed graphs, and we have fully generalized Stanley's theorem to signed graphs by finding an appropriate basis set for these new functions. This result is comparable in simplicity to the 1995 theorem.

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[Joint with Jake Huryn]

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