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**Ruimin Cai, James Farre, Jessica Sidman\*** (jsidman@mtholyoke.edu), **Audrey St. John, Louis Theran** and **Xilin Yu**. *Polynomials in rigidity theory: special positions of frameworks*. Preliminary report.

In rigidity theory, a framework is specified by giving  $n$  full-dimensional rigid bodies in  $R^d$  and a set of geometric constraints among them. The fundamental question is to determine if the framework is rigid or if it admits relative motions between the bodies. Such a framework has an associated multigraph  $G$  encoding the combinatorics of the constraints, a rigidity matrix describing the conditions imposed on infinitesimal motions, and a bracket polynomial  $P_G$  that lives in the homogeneous coordinate ring of a certain Grassmannian. The polynomial  $P_G$  is the determinant of the rigidity matrix, and the variety it defines consists of special embeddings of the framework with nongeneric behavior. We will discuss how the combinatorics of  $G$  can be used to understand the structure of  $P_G$ . (Received September 19, 2015)