



## The maximum likelihood threshold of a graph

Elizabeth Gross\*

San José State University, San José, U.S.A. - elizabeth.gross@sjsu.edu

Seth Sullivant

North Carolina State University, Raleigh, U.S.A. - smsulli2@ncsu.edu

The maximum likelihood threshold of a graph is the smallest number of data points that guarantees that maximum likelihood estimates exist almost surely in the Gaussian graphical model associated to the graph. We show that this graph parameter is connected to the theory of combinatorial rigidity. In particular, if the edge set of a graph  $G$  is an independent set in the  $(n - 1)$ -dimensional generic rigidity matroid, then the maximum likelihood threshold of  $G$  is less than or equal to  $n$ . In this talk, we will show how this connection allows us to prove many results about the maximum likelihood threshold.

**Keywords:** graphical models; maximum likelihood estimation; combinatorial rigidity; matrix completion.