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*Rigidity of Ramanujan graphs.* Preliminary report.

A graph is generically rigid in  $n$ -space if it is the underlying graph of an infinitesimally rigid bar framework in Euclidean  $n$ -space, where edges correspond to rigid bars and vertices correspond to ball-joints. This gives rise to a matroid on the edges of the graph, the  $n$ -dimensional rigidity matroid. There are good combinatorial characterizations of this matroid for dimensions 1 and 2 but none yet for higher dimensions. We use the expansion properties of Ramanujan graphs together with the results of Jackson and Jordán on the  $d$ -dimensional rigidity matroid of sparse graphs [J. Combin. Theory Ser. B 95 (2005), no. 1, 118–133] to examine their rigidity properties. (Received September 16, 2007)