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On Bar Frameworks, Stress Matrices and Semidefinite Programming

In this talk, we show that semidefinite programming (SDP) can be effectively used in addressing the universal rigidity problem. In particular, we use the notion of SDP non-degeneracy to obtain a sufficient condition for universal rigidity, and to re-derive the known sufficient condition for generic universal rigidity. We present new results concerning positive semidefinite stress matrices and we use a semidefinite version of Farkas's lemma to characterize bar frameworks that admit a nonzero positive semidefinite stress matrix.