Sufficient conditions for
2-dimensional graph rigidity

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Abstract: A graph is rigid in R^d if one places the vertices of the graph in the R^d, in general position, there will be no simultaneous continuous motion of all the points, other than Euclidean congruences, that preserves the lengths of all the graph edges. In R^2, Geiringer in 1927, and independently Laman in 1970, gave a nice combinatorial characterization of rigid graphs. Using another characterization, Lovász and Yemini in 1982 showed that every 6-connected graph is rigid. We give two further sufficient connectivity conditions for a graph to be rigid. Our proofs surprisingly involve a discharging argument. This is based on a joint work with Xiaofeng Gu, Wei Meng, Martin Rolek, and Yue Wang.