

Angular Constraints on Bar-and-Joint Frameworks in the Plane.

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Fix n points in the plane: how many of the distances among these points must be known to fully constrain all pairwise distances? The classical Laman-Pollaczek-Geiringer theorem answered this question. Whiteley and Servatius demonstrated that the same theory applies to directional constraints via a 90 degree rotation.

In this project, we replace the directional constraints by angular constraints. We establish some necessary conditions for rigidity by analyzing a modified rigidity matrix. Using algebraic tools, we compute fiber cardinalities for some angle constraint systems. We also discuss possible Laman type conditions and Henneberg moves in the angular context. This is based in part on joint work with Sean Dewar, Georg Grasegger, Zvi Rosen, William Sims, and Meera Sitharam.