

Kristin Camenga (Cornell)

Characterizing Inscriptible Polyhedra

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Steiner asked in 1832 which (3-dimensional) polyhedra could be inscribed in a sphere. Although Steinitz characterized all polyhedra and gave a family of polyhedra that could not be inscribed, not much progress was made and some thought a characterization was out of reach. Hodson, Rivin and Smith gave a characterization in 1992, using results of Rivin based on study of ideal hyperbolic polytopes. In this talk, I will look at their characterization, how it can be used, and some of the highlights of its proof, especially how hyperbolic geometry is used to work with Euclidean polyhedra. As time permits, I will discuss graph-theoretic requirements for inscriptible polyhedra.

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