

Dürer's spiders and other loci of centroids

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MON/BE01 16:30–16:50

In his famous book *Unterweysung der Messung mit dem Zirckel und Richtscheyt in Linien, Ebenen und gantzen Corporen* (1525) the painter Albrecht Dürer developed an interesting class of algebraic curves of degree 4 called spiders, which were rediscovered by Étienne Pascal a century later and therefore are also called limaçons of Pascal. We study loci of several centroids (centroid of vertices, centroid of the perimeter, centroid of the area) of one-parameter families of triangles and convex quadrangles with fixed circumcircle by means of dynamical geometry software and computer algebra system. Surprisingly we obtained Dürer's spiders in some interesting cases. But we also found curves of higher degree, up to 20. The computational problems reach sometimes a complexity which needs large computers and special programs (provided by the chair for algorithmic algebra at the Technical University of Munich).