

Singular points of plane curves obtained from geometric constructions: automated methods in man-and-machine collaboration

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Abstract. We explore envelopes and offsets, using automated commands for envelopes and geometric loci. The topology of envelopes and offsets is generally more complicated than that of the progenitor, whence the importance to study the singularities. The work involves both analytic and algebraic methods (Gröbner bases, elimination), and networking between different kinds of software. Accurate plotting is a central issue, for which the new command Plot2D provided by GeoGebra-Discovery is efficient. Finally we discuss briefly how some pitfalls of AI can and should be used to develop critical thinking and other skills. The activities presented here have been proposed to in-service teachers learning towards an advanced degree.

Keywords: Plane curves, automated commands, singularities, AI