On curves with circles as their isoptics

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The main part of my lecture is a joint work with prof. W. Cieślak. Let us fix $\alpha \in (0, \pi)$. Let $C\alpha$ be the locus of vertices of a fixed angle $\pi - \alpha$ formed by two tangent lines of a closed convex plane curve C of class C^1. The curve $C\alpha$ will be called an α-isoptic of C, see [1]-[5]. In the talk we describe the family of all closed convex plane curves of class C^1 which have circles as their isoptics and explain why these curves form a generalization of ovals of constant width, [3, 7]. In the first part of the talk we give a certain characterization of all ellipses based on the notion of isoptic and we give a geometric characterization of curves whose orthoptics are circles. The second part of the talk contains characterization of curves which have circles as their isoptics and we describe the form of support functions of these curves. In this framework, at the end, we present a generalization of the theorem characterizing ovals of constant width proved by Mellish in 1931, [6, 7].

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