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*On the algebraic sum of a planar set and a smooth curve*

Given a set  $A \subset \mathbb{R}^2$ , we study the set of those points on the plane which are at a distance 1 from at least one of the elements of  $A$ , where "distance" means either the Euclidean distance or some other natural distances on the plane. This set is  $A + S^1$ , where  $S^1$  is the unit circle in the given distance. More generally, we consider  $A + \Gamma$ , for a suitable curve  $\Gamma$ . We provide a variety of conditions which guarantee that  $A + \Gamma$  is big in the sense that it contains interior points. A connected problem is to the study of pinned distance sets. We also prove that the pinned distance set of  $C \times C$ , where  $C$  is a sufficiently thick Cantor set has interior. This is joint work with Karoly Simon.