Distance and critical points on PL-manifolds.

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There is long history in the relation between the critical points of distance function and concurrent normals to a submanifold in Euclidean space. The study of caustics and counting the number of normals play a important role. In this talk we will give a general approach to the study of critical points of the distance function to a PL submanifold X. Examples are: polygons in the plane and polygonal surfaces in 3-space (not necessarily convex), etc. What is the relation between normals and critical points ? Are generic singularities Morse and if so what is the index ? We will discuss the bifurcation set and also show that for a convex simple polytope there is a point at least 10 concurrent normals. What can be said about the ED-degree ? If time allows we will also discuss double normals.

References

[1] I. Nasonov, G. Panina, D. Siersma, Concurrent Normals Problem for convex Polytopes and Eucledian Distance Degree, *Acta Math. Hungar.* **174,** (2024) 522-538.