November 28, 2022

Arsen Kh. Galstyan

The Fermat–Steiner problem in hyperspaces over finite-dimensional normed spaces

We consider the Fermat–Steiner problem in the metric space $(H(X), d_H)$ of all non-empty compact subsets of a finite-dimensional normed space X over the field $\mathbb{R}$.

For boundaries consisting of finite compacts:

- A criterion is obtained for when a compact K in $(H(X), d_H)$ is a minimal Steiner compact;
- An algorithm for constructing minimal compact sets for a given vector of solutions is proposed;
- An estimate is given for the number of points in the minimal Steiner compact;
- It was defined the hook set of the maximum Steiner compact with boundary, in terms of which, in particular, the criterion of uniqueness of the minimal Steiner compact in the class of solutions is obtained.

For boundaries consisting of convex compacts:

- A non-trivial structure of the relationship between boundary and maximal Steiner compact set is described;
- An answer is given to the question of what will happen to the solution vectors and what will be the maximal Steiner compact in the case of passing from a boundary of finite compact sets to the boundary of their convex hulls;
- A sufficient condition is found under which the minimum sum of Hausdorff distances during the passing will be strictly less than the original one;
- It was proved the continuity of the Hausdorff distance while some deformation over convex compact sets, which makes it possible to obtain the above results for convex compact subsets.

For general boundaries we have got a series of results, which allowed to generalize the hook set notion to general form boundaries.

SCIENTIFIC SEMINAR
"DIFFERENTIAL GEOMETRY AND APPLICATIONS"

headed by Academician of RAS Anatoly T. Fomenko

The seminar takes place online in ZOOM on Mondays
from 4:45 p.m. to 6:20 p.m. (Moscow time)
The zoom-ref is provided only to registered persons
To be registered, ask any participant of our seminar to endorse you
Announcements of previous talks can be found on the seminar website
`http://dfgm.math.msu.su/chairsem.php`