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**AN OBJECT BYPASSING CONVEX SETS AND AN OBSERVER'S  
TRAJECTORY IN TWO-DIMENSIONAL SPACE****V. I. Berdyshev**

An autonomous object  $t$  moving under observation in  $\mathbb{R}^2$  with constant speed along a shortest curve  $\mathcal{T}_t$  with given initial and final points bypasses an ordered family of pairwise disjoint convex sets. The aim of the observer  $f$ , whose speed is upper bounded, is to find a trajectory  $\mathcal{T}_f$  on which the distance to the observer is at each time a certain prescribed value. Possible variants of motion are given for the observer  $f$ , who tracks the object on different segments of the trajectory  $\mathcal{T}_t$ .

Keywords: navigation, optimal trajectory, moving object, observer.

**REFERENCES**

1. Berdyshev V.I. The observer's trajectory following the object passing the obstacle on the shortest curve. *Eurasian J Math. Comp. Appl.*, 2021, vol. 9, iss. 4, pp. 4–16. doi: 10.32523/2306-6172-2021-9-4-4-16.
2. Lyu V. Path planning methods in an environment with obstacles (A review). *Mat. Mat. Model.*, 2018, vol. 1, pp. 15–58 (in Russian). doi: 10.24108/mathm.0118.0000098.

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