

# The shadow problem and its generalization

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This thesis is devoted to investigation of properties of generalized convex sets in the real Euclidean  $n$ -dimensional space  $\mathbb{R}^n$  and in the  $n$ -dimensional complex and hypercomplex spaces  $\mathbb{C}^n$  and  $\mathbb{H}^n$  respectively. The significant results in these directions were obtained by A. Martino, L. Aisenberg, G. Hudajberganov, Yu. Zelinskii, G. Mkrtchyan, M. Tkachuk, T. Osipchuk, B. Klishchuk and others.

In the thesis there was solved the classical problem of shadow (What minimal quantity of pairwise disjoint balls with centres on the sphere  $S^{n-1}$  is enough for any straight line, passing through the centre of the sphere, to cross at least one of these balls?). There was also studied some generalizations of this problem: the problem of shadow for half-convexity, the problem of shadow for arbitrary point of the interior of a sphere, the problem of shadow for the family of sets obtained from a convex set with non-empty interior by a group of geometric transformations which consists from parallel translations and homotheties, the problem of shadow in the complex and hypercomplex spaces.

## References

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- [2] Stefanchuk M. V., Zelinskii Yu. B. Generalizations of the shadow problem // Ukr. Mat. Zh. — 2016. — **68**, 6. — P. 757 – 763.