

Abstracts

2010 MSC. 30C75

A. K. Bakhtin, L. V. Vyhivska. **Estimates of the inner radii of symmetric nonoverlapping domains** // Ukrainian Mathematical Bulletin, **15** (2018), No. 3, 298–320.

We consider the problem of estimation of the functional

$$I_n(\gamma) = r^\gamma(B_0, 0) \prod_{k=1}^n r(B_k, a_k),$$

where $r(B_k, a_k)$ is the inner radius of a domain B_k relative to the point a_k , under the condition $a_0 = 0$, $|a_k| = 1$, $k = \overline{1, n}$, $a_k \in B_k \subset \overline{\mathbb{C}}$, where the domains $B_k \cap B_p = \emptyset$, $k \neq p$, $k, p = \overline{0, n}$, and the domains B_k , $k = \overline{1, n}$, possess a symmetry relative to a unit circle. In some partial cases, this problem was solved in [2–5]. The present work is devoted to the study of the problem for $\gamma \in (1, n^{\frac{1}{3}}]$ and $n \geq 14$.

References. 13

2010 MSC. 54E35

T. Banakh, I. Protasov. **Constructing balleanes** // Ukrainian Mathematical Bulletin, **15** (2018), No. 3, 321–331.

A ballean is a set endowed with a coarse structure. We introduce and explore three constructions of balleanes from a pregiven family of balleanes: bornological products, bouquets, and combs. We analyze also the smallest and largest coarse structures on a set X compatible with a given bornology on X .

References. 11

T. O. Banakh, A. K. Prykarpatsky. **Ergodic deformations of nonlinear Hamilton systems and local homeomorphism of metric spaces** // Ukrainian Mathematical Bulletin, **15** (2018), No. 3, 332–344.

The orbits of slowly perturbed Hamilton systems and the associated ergodic deformations of Lagrange manifolds are studied. The main results are based on the Mather approach [18, 19] to the construction of the homologies of invariant probabilistic measures, which minimize some Lagrange functionals, and on the

elliptic Gromov–Salamon–Zehnder–Floer theory [7,9,12,20,26] of the construction of invariant manifolds. We have constructed the invariant submanifolds, which are the supports of invariant ergodic measures and have a structure of locally homeomorphic metric spaces. We analyze the problem of construction of efficient criteria of their global homeomorphism, which was posed by Professor A. M. Samoilenko during the study of ergodic deformations of nonlinear Hamilton systems and their adiabatic invariants. It is established that the mapping $f : X \rightarrow Y$ from a linearly connected Hausdorff space X onto a simply connected (in particular, contractible) space Y is a homeomorphism iff f is local and homeomorphic, and the preimage $f^{-1}(y)$ of every point $y \in Y$ is a nonempty compact subset in X .

References. 7

2000 MSC. 30C75

I. Ya. Dvorak. **Estimates of the products of inner radii for partially nonoverlapping domains of the complex plane** // Ukrainian Mathematical Bulletin, **15** (2018), No. 3, 345–357.

Two problems of description of extremal configurations maximizing a product of the inner radii of mutually nonoverlapping domains are studied. One of the problems is analyzed in a more general situation: instead of nonoverlapping domains, the domains under the condition of partial disjointness are considered. The well-known problem posed in the work by V. N. Dubinin in 1988 is solved by Theorems 1 and 2. We study also the problem of maximum of a functional with the additional condition of symmetry defined by the domain G_0 . Theorems 3 and 4 give its partial solution.

References. 17

2010 MSC. 30C65, 30D40, 31B15, 31C12

D. P. Il'yutko, E. A. Sevost'yanov. **On prime ends on Riemannian manifolds** // Ukrainian Mathematical Bulletin, **15** (2018), No. 3, 358–382.

We study the boundary behavior of the classes of ring mappings on Riemannian manifolds, which are a generalization of quasiconformal mappings by Gehring. In terms of the prime ends of regular domains, the theorems of continuous extension of those classes onto the boundary of a domain are presented.

References. 16

2010 MSC. 42A10, 42B99

K. V. Pozhars'ka. **Entropy numbers of the Nikol'skii–Besov-type classes of periodic functions of many variables** // Ukrainian Mathematical Bulletin, **15** (2018), No. 3, 383–398.

The ordinal estimates of entropy numbers of the Nikol'skii–Besov classes of periodic functions of many variables in the Lebesgue space are constructed. For the corresponding choice of a majorant function for the mixed modulus of continuity, those classes coincide with the classes Nikol'skii–Besov.

References. 29

2010 MSC. 30C65, 31B15, 31B25

E. A. Sevost'yanov, S. A. Skvortsov. **On the local behavior of a class of inverse mappings** // Ukrainian Mathematical Bulletin, **15** (2018), No. 3, 399–419.

We study the families of mappings such that the inverse ones satisfy an inequality of the Poletskii type in the given domain. It is proved that those families are equicontinuous at the inner points, if the initial and mapped domains are bounded, and the majorant responsible for a distortion of the modulus is integrable. But if the initial domain is locally connected on its boundary, and if the boundary of the mapped domain is weakly flat, then the corresponding families of mappings are equicontinuous at the inner and boundary points.

References. 19

2010 MSC. 30C70, 30C75

A. L. Targonskii. **About one extremal problem for the projections of points on a unit circle** // Ukrainian Mathematical Bulletin, **15** (2018), No. 3, 418–430.

Sharp estimates of a product of inner radii for pairwise disjoint domains are obtained. In particular, the extremal problem in the case of any finite number of free poles at the points on rays is solved.

References. 19

2010 MSC. 30C75, 32A30

Y. Zabolotnii, I. Denega. **Extremal decomposition of a multidimensional complex space for five domains** // Ukrainian Mathematical Bulletin, **15** (2018), No. 3, 431–441.

The paper is devoted to one open extremal problem in the geometric function theory of complex variables associated with estimates of a functional defined on the systems of non-overlapping domains. We consider the problem of the maximum of a product of inner radii of n non-overlapping domains containing points of a unit circle and the power γ of the inner radius of a domain containing the origin. The problem was formulated in 1994 in Dubinin's paper in the journal "Russian Mathematical Surveys" in the list of unsolved problems and then repeated in his monograph in 2014. Currently, it is not solved in general. In this paper, we obtained a solution of the problem for five simply connected domains and power $\gamma \in (1, 2.57]$ and generalized this result to the case of multi-dimensional complex space.

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