

## Publications of S. Buyalo

### Research articles

#### A. Articles published, or accepted for publication, in research journals

1. An extremal theorem of Riemannian geometry, *Math. Notes* 19 (1976), 486–473.
2. To an extremal case of a volume estimate for a Riemannian manifold, *Ukr. Geom. Sbornik* 20 (1977), 23–27.
3. Comparison theorem for volumes in Riemannian geometry, *Ukr. Geom. Sbornik* 21 (1978), 15–21.
4. Shortest paths on convex hypersurfaces of Riemannian spaces, *J. of Soviet. Math.* 12 (1979), 73–85.
5. Some analytical properties of convex sets in Riemannian spaces, *Math. USSR-Sbornik* 35 (1979), 333–350.
6. Manifolds of nonpositive curvature with small volume, *Math. Notes* 29 (1981), 125–130.
7. Volume and the fundamental group of a manifold of nonpositive curvature, *Math. USSR-Sbornik* 50 (1985), 137–150.
8. Euclidean planes in three-dimensional manifolds of nonpositive curvature, *Math. Notes* 43 (1988), 60–66.
9. Three-dimensional nonpositively curved manifolds, containing Euclidean planes, *Sov. Math. Dokl.* 40 (1990), 184–186.
10. Closed geodesics on two-orbifolds of nonpositive curvature, *Leningrad Math. J.* 1 (1990), 653–674.
11. Collapsing manifolds of nonpositive curvature. I, *Leningrad Math. J.* 1 (1990), 1135–1155.
12. Collapsing manifolds of nonpositive curvature. II, *Leningrad Math. J.* 1 (1990), 1371–1399.

13. Graphs associated with a Hadamard manifold and its isometry group, Ukr. Geom. Sbornik 34 (1991), 19–31.
14. Euclidean planes in open three-manifolds of nonpositive curvature, St. Petersburg Math. J. 3 (1992), 83–96.
15. Homotopy invariance of some geometric properties of nonpositively curved three-manifolds, St. Petersburg Math. J. 3 (1992), 791–808.
16. joint with V. Kobel'skii, Closed flats in complexes of type  $A_1 \times A_1$  of nonpositive curvature, International Conference on Diff. Geom. and Global Anal., Münster June (1992), 14–16.
17. The finiteness theorem for three-manifolds of nonpositive curvature, Amer. Math. Soc. Translation 159 (1994), 25–43.
18. An example of negatively curved 4-manifold, St. Petersburg Math. J. 5 (1994), 171–176.
19. Three-dimensional manifolds with Cr-structure, Some Questions of Geometry in the Large. Amer. Math. Soc. Translation 176 (1996), 1–26.
20. joint with W. Ballmann, Metrics of nonpositive curvature on 2-polyhedra, Math. Z. 222 (1996), 97–134.
21. joint with V. Kobel'skii, Cusp Closing of Hyperbolic Manifolds, Geom. Dedicata 59 (1996), 147–156.
22. joint with V. Kobel'skii, Geometrization of graph-manifolds. I. Conformal geometrization, Algebra i Analys 7, (1995), 3–45; English transl. St. Petersburg Math. J. 7 (1996), 185–216.
23. joint with V. Kobel'skii, Geometrization of graph-manifolds. II. Isometric geometrization, Algebra i Analys 7 (1995), 96–117; English transl. St. Petersburg Math. J. 7 (1996), 387–404.
24. joint with V. Kobel'skii, Geometrization of infinite graph-manifolds, Algebra i Analys 8 (1996), 56–77; English transl. St. Petersburg Math. J. 8 (1997), 413–427.
25. joint with I. Arshinova, Metrics of curvature bounded from above on 2-polyhedra, Algebra i Analys 8 (1996), 163–188; English transl. St. Petersburg Math. J. 8 (1997), 825–844.

26. joint with Yu. Burago, Metrics of curvature bounded above on 2-polyhedra.II, *Algebra i Analys* 10 (1998), 62–112; English transl. *St. Petersburg Math. J.* 10 (1999), 619–650.
27. Geodesics in Hadamard spaces, *Algebra i Analys* 10 (1998), 93–123; English transl. *St. Petersburg Math. J.* 10 (1999), 293–313.
28. joint with V. Kobel'skii, Generalized graphmanifolds of nonpositive curvature, *Algebra i Analys* 11 (1999), 64–87; English transl. *St. Petersburg Math. J.* 11 (2000), 251–268.
29. joint with V. Schroeder and M. Walz, Geodesics avoiding open subsets in surfaces of negative curvature, *Ergod. Th. & Dynam. Sys.* 20 (2000), 1–16.
30. Measurability of self-similar spectral geometries, *Algebra i Analys* 12 (2000), 1–39; English transl. *St. Petersburg Math. J.* 13 (2001), 353–377.
31. Spectral geometries on a compact metric space, POMI Preprint 19, 1999, arXiv: math. OA/1710.11333, *Algebra i analys*, 30 (2018) n.5, 84–111.
32. joint with V. Schroeder, On the asymptotic geometry of nonpositively curved graph-manifolds, *Trans. Amer. Math. Soc.* 353 (2001), 853–875.
33. joint with V. Schroeder, Extension of Lipschitz maps into 3-manifolds, *Asia J. Math.* 5 (2001), 685–704.
34. Volume entropy of hyperbolic graph surfaces, *Ergod. Th. and Dynam. Sys.* 25 (2005), 403–417.
35. Metrics of nonpositive curvature on graph-manifolds and electromagnetic fields on graphs, *Zap. nauchn. sem. POMI* 280 (2001), 28–72.
36. joint with V. Schroeder, Invariant subsets of rank 1 manifolds, *Manuscripta math.* 107 (2002), 73–88.
37. joint with V. Schroeder, Hyperbolic rank and subexponential corank of metric spaces, *Geom. funct. anal.* 12 (2002), 293–306.
38. An estimate for the volume entropy of nonpositively curved graph manifolds, *Algebra i analys*, 15, 2003, 63–72; English transl. *St. Petersburg Math. J.* 15 (2004), 41–47.

39. joint with W. Ballmann, Periodic rank one geodesics in Hadamard spaces, *Contemporary Math.*, v. 469 (2008), 19–27.
40. joint with P. Svetlov, Topological and geometric properties of graph-manifolds, *Algebra i analiz*, v.16, n.2 (2004), 3–68; English transl. *St. Petersburg Math. J.* 16 (2005), 297–340.
41. joint with V. Schroeder, Embedding of hyperbolic spaces in the product of trees, *Geom. Dedicata*, 113 (2005), 75–93.
42. joint with V. Schroeder, Hyperbolic dimension of metric spaces, *Algebra i analiz*, 19 (1) (2007), 93–108; arXiv:math. GT/0404525.
43. Asymptotic dimension of a hyperbolic space and capacity dimension of its boundary at infinity, *Algebra i analiz*, 17, n.2 (2005), 70–95; English transl. *St. Petersburg Math. J.* 17 (2006), 267–283.
44. Capacity dimension and embedding of hyperbolic spaces into the product of trees, *Algebra i analiz*, 17, n.4 (2005), 42–58; English transl. *St. Petersburg Math. J.* 17 (2006), 581–591.
45. joint with V. Schroeder, A product of trees as universal space for hyperbolic groups, arXiv:math. GR/0509355.
46. joint with N. Lebedeva, Dimensions of locally and asymptotically self-similar spaces, *Algebra i analiz*, 19 (1) (2007), 60–92; arXiv:math. GT/0509433.
47. joint with A. Dranishnikov and V. Schroeder, Embedding of hyperbolic groups into products of binary trees, *Inventiones Mathematicae*, 169, n.1 (2007), 153–192.
48. joint with V. Schroeder, Spaces of Curvature Bounded Above, *Surveys in Differential Geometry XI*, 2007, 293–326.
49. joint with A. Kuznetsov, Boundary at infinity of symmetric rank one spaces, *Algebra i analiz*, 21 (2009), no.5, 3–18; *St. Petersburg Math. J.* 21 (2010), no.5, 681–691; DOI:10.1090/S1061-0022-2010-01111-7 arXiv:math.DG/0906.0779.
50. joint with V. Schroeder, Möbius structures and Ptolemy spaces: boundary at infinity of complex hyperbolic spaces, arXiv:math.MG/1012.1699.

51. joint with V. Schroeder, Möbius characterization of the boundary at infinity of rank one symmetric spaces, arXiv:math.MG/1211.3237; *Geometria Dedicata*, DOI:10.1007/s10711-013-9906-6, Volume 172, Issue 1 (2014), Page 1-45
52. joint with V. Schroeder, Incidence axioms for the boundary at infinity of complex hyperbolic spaces, arXiv:MG/1409.0984; *Anal.Geom.Metr. Spaces* 2015; 3:244–277, DOI 10.1515/agms-2015-0015
53. Möbius and sub-Möbius structures, *Algebra i analys*, 28 (2016), n.5, arXiv:math.MG/1608.07229
54. Möbius structures and timed causal spaces on the circle, *Algebra i analys*, 29 (2017), n.5, arXiv:math. MG/1705.00478
55. On the inverse problem of Möbius geometry on the circle, arXiv: math. MG/1810.03133

#### B. Monographs

1. Introduction to metric geometry. Lecture notes, Education Press, St. Petersburg, 1997.
2. Metric spaces of curvature bounded above. Lecture notes, Education Press, St. Petersburg, 1997.
3. Metric spaces of nonpositive curvature. Lecture notes, Education Press, St. Petersburg, 1997.
4. joint with V. Schroeder, Elements of asymptotic geometry, EMS Monographs in Mathematics, 2007, 209 pages.

#### C. Articles submitted for publication

#### D. Articles not included above

1. Master thesis, Some comparison theorems in Riemannian geometry, Leningrad, 1974, 25 pp.
2. Ph. D. thesis, Convex sets and extremal theorems in Riemannian geometry, Leningrad, 1977, 86 pp.
3. thesis for the Doctor degree, Manifolds of nonpositive curvature, Leningrad, 1989, 253 pp.