WAISTS OF BALLS IN DIFFERENT SPACES

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Gromov and Memarian [5, 6] have established the *waist inequality* asserting that for any continuous map $f : \mathbb{S}^n \to \mathbb{R}^{n-k}$ there exists a fiber $f^{-1}(y)$ such that every its t-neighborhood has measure at least the measure of the t-neighborhood of an equatorial subsphere $\mathbb{S}^k \subset \mathbb{S}^n$.

Going to the limit we may say that the $(n-k)$-volume of the fiber $f^{-1}(y)$ is at least that of the standard subsphere $\mathbb{S}^k \subset \mathbb{S}^n$. We extend this limit statement to the exact bounds for balls in spaces of constant curvature, tori, parallelepipeds, projective spaces and other metric spaces.

By the volume of preimages for a non-regular map f we mean its *lower Minkowski content*, some new properties of which will be also presented in the talk.

References

[1] A. V. Akopyan, A. Hubard, and R. N. Karasev, *Lower and upper bounds for the waists of different spaces*, Topological Methods in Nonlinear Analysis, to appear.

[2] A. V. Akopyan and R. N. Karasev, *A tight estimate for the waist of the ball*, Bull. London Math. Soc., 2017,

[3] A. V. Akopyan and R. N. Karasev, *Gromov's waist of non-radial Gaussian measures and radial non-Gaussian measures*, 2018, Arxiv:1808.07350.

[4] A. V. Akopyan and R. N. Karasev, *Waist of balls in hyperbolic and spherical spaces*, Int. Math. Res. Notices, 2018.

[5] M. Gromov. Isoperimetry of waists and concentration of maps. *Geometric and Functional Analysis*, 13:178–215, 2003.

[6] Y. Memarian. On Gromov's waist of the sphere theorem. *Journal of Topology and Analysis*, 03(01):7–36, 2011.

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