Combinatorial negative curvature

Damian Osajda

Suggested topics for presentations

(1) Asymptotic dimension: its quasi-isometric invariance, finiteness of asymptotic dimension of hyperbolic groups. (suggested source: [NY12, Chapters 2.1, 2.2, and 2.3])
(2) Ends of groups: definition and quasi-isometric invariance (suggested source: [DK16, Chapter 9.1])
(3) Asymptotic cones: definition and quasi-isometric invariance. (suggested source: [DK16, Chapters 10.6 and 10.8])
(4) Characterization of quasi-trees. (suggested source: [Man05, Theorem 4.6])
(5) Real hyperbolic space H^n. (suggested source: [DK16, Chapter 4], [BH99, Chapters I.2 and I.6])
(6) Systolic groups: local-to-global characterization, hyperbolicity. (suggested source: [JŚ06], [Pry14])
(7) (**Konrad Anand**) Small cancellation. (suggested source: [MW02], [LS01, Chapter V])
(8) Various proofs of residual finiteness of free groups. (suggested source: www).
(9) (**Junyu Lu**) Proof of Mal'cev's Theorem on residual finiteness of linear groups. (suggested source: [DK16, Appendix])
(10) (**Forte Shinko**) Constructions of groups with Kazhdan's property (T).
(11) Haagerup property. (suggested source: [NY12, Chapter 6.2])
(12) (**Nima Hoda**) Coarse median spaces and groups.
(13) Wolf's Theorem for $\mathbb{Z}^n \rtimes \mathbb{Z}$. (suggested source: [DK16, Chapter 14.1])
(14) (**Brahim Abdenbi**) Proof of the Hanna Neumann Conjecture.
(15) (**Jiakai Li**) Proofs of Bieberbach's Theorems.

References

[BH99] Martin R. Bridson and André Haefliger, *Metric spaces of non-positive curvature*, Grundlehren der Mathematischen Wissenschaften [Fundamental Principles of Mathematical Sciences], vol. 319, Springer-Verlag, Berlin, 1999. MR1744486

[DK16] Cornelia Druţu and Michael Kapovich, *Geometric group theory*, 2016, available at https://www.math.ucdavis.edu/ kapovich/EPR/ggt.pdf.

[JŚ06] Tadeusz Januszkiewicz and Jacek Świątkowski, *Simplicial nonpositive curvature*, Publ. Math. Inst. Hautes Études Sci. **104** (2006), 1–85, DOI 10.1007/s10240-006-0038-5. MR2264834

[LS01] Roger C. Lyndon and Paul E. Schupp, *Combinatorial group theory*, Classics in Mathematics, Springer-Verlag, Berlin, 2001. Reprint of the 1977 edition. MR1812024

[Man05] Jason Fox Manning, *Geometry of pseudocharacters*, Geom. Topol. **9** (2005), 1147–1185, DOI 10.2140/gt.2005.9.1147. MR2174263

[MW02] Jonathan P. McCammond and Daniel T. Wise, *Fans and ladders in small cancellation theory*, Proc. London Math. Soc. (3) **84** (2002), no. 3, 599–644, DOI 10.1112/S0024611502013424. MR1888425

[NY12] Piotr W. Nowak and Guoliang Yu, *Large scale geometry*, EMS Textbooks in Mathematics, European Mathematical Society (EMS), Zürich, 2012. MR2986138

[Pry14] Tomasz Prytuła, *Infinite systolic groups are not torsion* (2014), preprint, available at `arXiv:1402.4421`.