PROPOSTA DE MINI-CURSO PARA A ESCOLA DE VERÃO 2019 DA UNB TÓPICOS DE GEOMETRICA MÉTRICA

PEDRO ZÜHLKE

§1. Description

This is an introductory course consisting of five lectures whose aim is to introduce the audience to some central topics in metric geometry in the sense of A.D. Alexandrov. The emphasis will be on connections with (geometric) group theory and spaces of non-positive curvature.

§2. Pre-requisites

We shall assume familiarity with the concepts of 'metric space' and 'group', and with the basic geometry of the euclidean and hyperbolic planes. Some acquaintance with differential geometry, especially with the concept of 'geodesic', is desirable for the sake of motivation.

§3. Course schedule

(1) *Basic concepts:* metric spaces, length, angles and geodesics; length and geodesic spaces; examples; Alexandrov lemma.
(2) *Curvature:* spaces of bounded curvature in the sense of Alexandrov; Hopf-Rinow; metric constructions (κ-cones, products, quotients, gluing)
(3) *Group actions:* word metrics; Cayley graphs; quasi-isometries; growth of groups.
(4) *Gromov-Hausdorff space:* Hausdorff and Gromov-Hausdorff metrics; correspondences and distortion; asymptotic and tangent cones.
(5) *CAT(0) spaces:* CAT(κ)-spaces; convexity; Cartan-Hadamard; isometries of CAT(0)-spaces.

§4. References

1. Martin Bridson and André Haefliger, *Metric spaces of non-positive curvature*, Grundlehren der mathematischen Wissenschaften, vol. 319, Springer-Verlag, Berlin, 1999.
2. D. Burago, Y. Burago, and S. Ivanov, *A course in metric geometry*, Graduate Studies in Mathematics, vol. 33, American Mathematical Society, 2001.

Departamento de Matemática, Universidade de Brasília (UNB)
Campus Darcy Ribeiro, 70910-900 – Brasília, DF, Brazil