

STUDY OF THE BEHAVIOUR OF ANGLE STRUCTURES IN ALEXANDROV SPACES WITH LOWER CURVATURE BOUNDS

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Alexandrov spaces with Curvature Bounded Below (CBB) constitute a core category of metric spaces extending the concepts of Riemannian geometry to provide a natural framework for studying comparison geometry, first introduced by A.D. Alexandrov in the 1950s. This study investigated the behaviour of angles formed in such spaces based on the fact that geodesics do not have branch points and aimed to explore and formalise the angular relationships in CBB spaces, which are central to understanding both local and global geometric structures. Firstly, a natural angle between two geodesics of Alexandrov spaces with CBB was defined by a constant k ($Curv(X) \geq k$). Next, three lemmas were established. They are Lemma on Angle Sub-additivity, Lemma on Angle Linearity, and Lemma on Limit Angle, which depict the properties of angles in these spaces. Specifically, these properties describe how angles behave at geodesic limits, how they satisfy sub-additive inequalities at a point and how they exhibit linearity along geodesics. Together, they contribute to a clearer geometric intuition of angle behaviour in these settings and establish structural constraints valuable in theoretical explorations. The proofs are presented in a structured and accessible manner, making them suitable for readers with diverse mathematical backgrounds.

Keywords: Alexandrov spaces, Angle behaviour, Curvature Bounded Below, Geodesics