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TITLE: Distance in the absolute plane and Cauchy functional equations

Abstract: Let \mathbb{A} denotes the absolute plane and d_a the distance function on it. Using a constructive approach which leads to the functional equations, we study which conditions on a “measure” of segments on a given half-line l in the absolute plane are essential to be the restriction of d_a on l .

Description: We consider two well-known models of the absolute plane which we call E-model and H-model. The E-model is actually the standard model of the Euclidean plane and the H-model is the Poincaré disk model of the hyperbolic plane. We used same proposition that states that there is a distance d_a (which is in accordance with the relations between and congruence) on the absolute plane and that it is unique up to a multiplicative constant. Let d_e and d_h be the interpretations of d_a in the E-model and in the H-model, respectively. We consider a fixed half-line l ($l = [0, 1)$ in the H-model and $l = [0, +\infty)$ in the E-model) and a function $f : l \rightarrow [0, +\infty)$ with some additive properties.

Scientific field: Mathematics

Scientific subfield: Geometry and Complex analysis