

Needham, VDGAF, Chapter 3, Exercise 6, p. 24

Palmer, December 3, 2021, 9 am PST

6. Use (1.3) to deduce that as the size of a triangle on the sphere shrinks to nothing, it ultimately appears to the inhabitants of the sphere to be Euclidian, i.e., with angle sum equal to π .

$$\varepsilon = \frac{1}{R^2} \mathcal{A} \quad (1.3)$$

As the size of a triangle shrinks to nothing, its area shrinks to nothing while R remains constant, so by (1.3) the angular excess ε must shrink to nothing. At sizes very near zero, the triangle viewed by the spheruleans appears to have Euclidean angles that sum to π . [This appears to be true whether or not the sides shrink proportionately. If the triangle shrinks to a line, the angles at the vertices shrink to 0, 0, and π .]