

Episode One Hundred Twenty - Letter to Herodotus 09 - Epicurus' Rejection of Infinite Divisibility

Post by "Martin" of June 22, 2022 at 5:59 AM

Quote

"I wonder if it is possible to figure out that, for example, the sum of an infinite series can be finite purely a priori."

In mathematics, series means the sum of a sequence. Therefore, I assume you mean ".. the sum of an infinite sequence can be finite purely a priori."

There is an easy proof that the infinite geometric series $1 + r + r^2 + r^3 + \dots$ is $1/(1 - r)$ for $r < 1$. This is finite for all cases $r < 1$. (With r as the ratio of the speed of the tortoise to the speed of Achilles and multiplied by the head start, $1/(1 - r)$ solves Zeno's paradox. Zeno formulates the paradox such that he arbitrarily limits the consideration to the interval before Achilles reaches the tortoise.)

For r equal to or greater than 1, the sum of the infinite geometric sequence $1, r, r^2, r^3 + \dots$ is infinite.