The Math of Achilles

Geoffrey A. Landis
NASA Glenn Research Center

The Math of Achilles

Geoffrey A. Landis

http://www.geoffreylandis.com
geoffrey.landis@earthlink.net

Sing, O Muse, of the math of Achilles
son of Peleus, the swiftest of Greeks.
Tell of the tale of his race with the tortoise:
most excellent in armor but not swift on his feet.
Sing of how the philosopher speaks.

Here's how the philosopher Zeno propounded
the paradox by which he Achilles confounded:
Fleet-footed Achilles could not beat a tortoise
For the challenge of a queer mathematical sort is.

Give him, O Greek, a head start of two paces
Thus, when he's started, you must first overtake his
starting position before you can pass.
But that your can never accomplish, alas.

At first he must go half the distance remaining
And when he's done that, half the distance that's left
And then once again half the distance attaining
And though with each step he may gain yet a half,
An infinite number of halves are yet to go
He'll never be finished, be the tortoise ever so slow.

So even Achilles much find himself overthrown,
To conquer infinity, as Zeno's clearly shown
Though the notion's implausible,
      motion's impossible
           the tortoise unpassable,
              therefore unbeatable,
                 and even invincible
Achilles must lose. It's the math of the Greeks.

So here is the lesson: you'll need infinitesimal
tools calculational to outthink the Greeks.
But Achilles, that rascal, just raced on past anyway
(Beating a turtle for him is just child's play)
so sometimes you shouldn't listen to what experts say.
–And always beware of the logic of Greeks.