Chapter 5.1: Measuring Distance

Calculus II

College of the Atlantic

Spring 2021

How far does the cat go?

A team of serious scientists have been studying the sprinting ability of cats. They have used a radar-gun type of apparatus to measure the speed of a cat. They want to know the distance the cat travels in four seconds. Velocity data from the radar gun is shown in Fig. 1.

1. Use $\Delta t = 2$ and determine a lower estimate for the distance the cat traveled.
2. Use $\Delta t = 2$ and determine an upper estimate for the distance the cat traveled.
3. Use $\Delta t = 1$ and determine a lower estimate for the distance the cat traveled.
4. Use $\Delta t = 1$ and determine an upper estimate for the distance the cat traveled.
5. Suppose you needed an estimate for the cat distance that was accurate to 0.01 meters. What Δt should you choose?

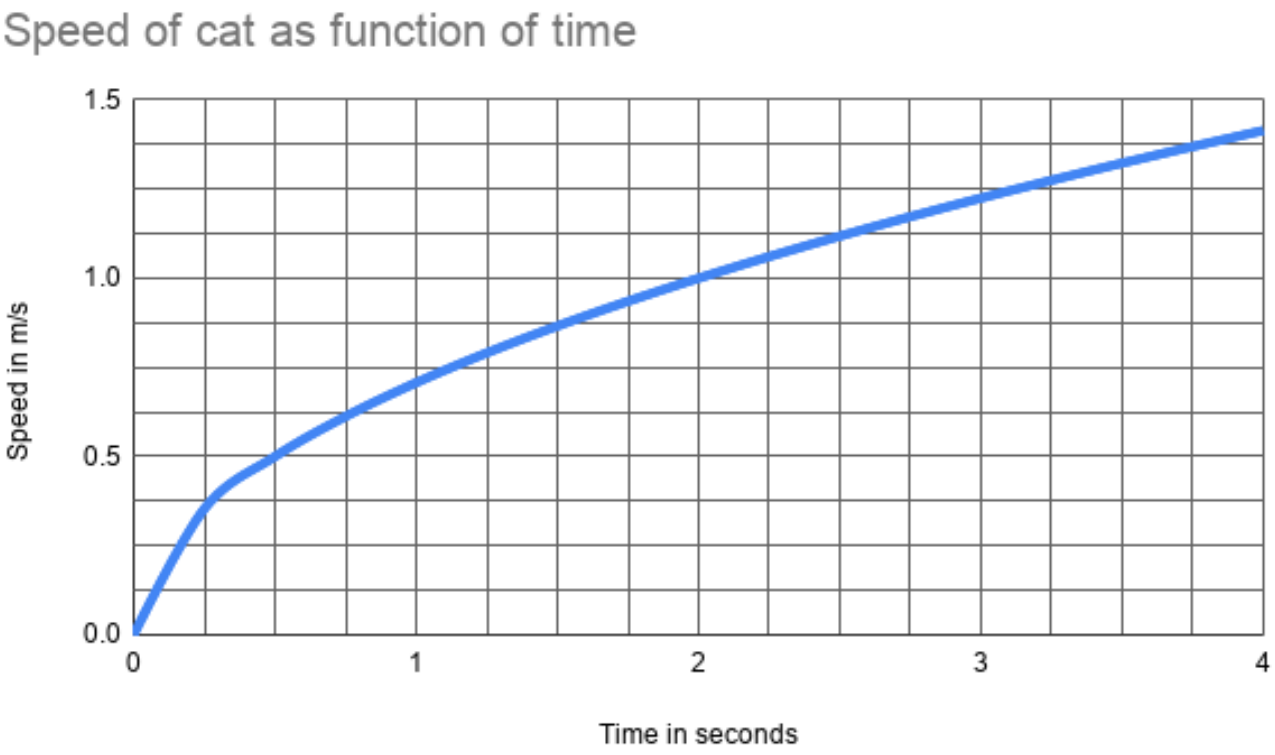
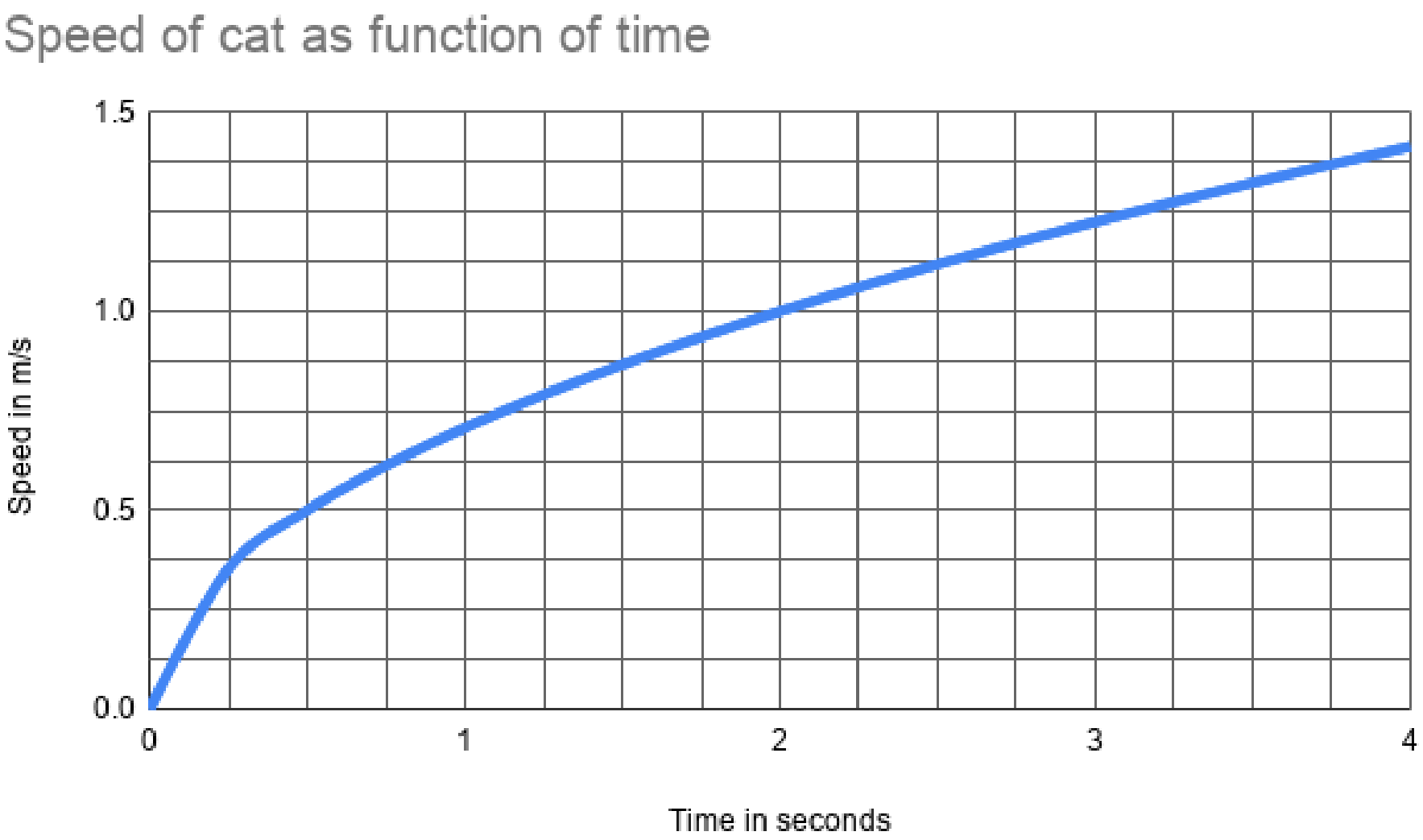


Figure 1: A graph of the speed of a cat as a function of time.

Figure 2: Zero-velocity cats. Left to right: Panda, Ancho, Apple.


Speed of cat as function of time
1.5
1.0
0.5
0.0
Speed in m/s
0
1
2
3
4
Time in seconds