Griffith Example 1.2

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David J. Griffiths and Darrell F. Schroeter. *Introduction to quantum mechanics*. Cambridge University Press Cambridge, United Kingdom, Cambridge, United Kingdom, third edition edition, 2018. ISBN 9781107189638; 1107189632; 9781108791106; 1108791107

Question

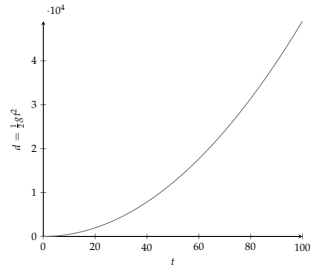
Suppose someone drops a rock off a cliff oh height h. As it falls, I snap a million photographs, as random intervals. On each picture I measure the distance the rock has fallen.

What is the average of all there distances? That is to say, what is the time average of the distance travelled?

Distance Formula

$x(t) = \frac{1}{2}gt^2$

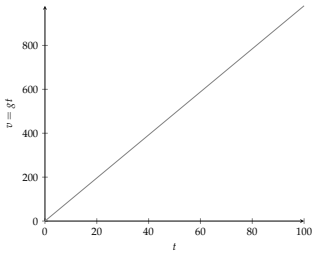
$g = 9.8067\mathsf{ms}^{-2}$



Velocity

$x(t) = \frac{1}{2}gt^2$

$\frac{dx}{dt} = gt$



Flight Time

Height: h; Total Flight Time: T

$h = \frac{1}{2}gT^2$

$\frac{2h}{g} = T^2$

$T = \sqrt{\frac{2h}{g}}$

Random Intervals