THE MEANING OF $\vec{R}'(t) = \frac{d\vec{R}}{dt} = \lim_{\Delta t \to 0} \frac{\Delta \vec{R}}{\Delta t}$

(courtesy of Prof. Kaz Tarui)

GIVEN: $\vec{R}(t) = \langle t, t^2 \rangle$ $\{Y = X^2$

COMPUTE: $\frac{\Delta \vec{R}}{\Delta t}$ FOR THE FOLLOWING TIME INTERVALS:

(A) t=1 TO t=2

$$\frac{\Delta \vec{R}}{\Delta t} = \frac{\vec{R}(2) - \vec{R}(1)}{2-1} = \frac{\langle \quad , \quad \rangle - \langle \quad , \quad \rangle}{2-1} = \langle \quad , \quad \rangle$$

(B) t=1 TO t=1.5

$$\frac{\Delta \vec{R}}{\Delta t} = \frac{\vec{R}(\quad) - \vec{R}(\quad)}{} = \frac{\langle \quad , \quad \rangle - \langle \quad , \quad \rangle}{} = \langle \quad , \quad \rangle$$

(C) t=1 TO t=1.1

$$\frac{\Delta \vec{R}}{\Delta t} = \frac{\vec{R}(\quad) - \vec{R}(\quad)}{} = \frac{\langle \quad , \quad \rangle - \langle \quad , \quad \rangle}{} = \langle \quad , \quad \rangle$$