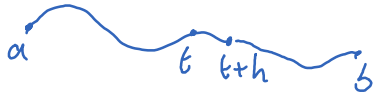


Lecture 8

Saturday, May 11, 2024 2:12 PM

More practice on finding the tangent line

Length of a parametric curve



$L(t)$ = length of the curve from a to t

$$L(t+h) - L(t) \approx |r(t+h) - r(t)|$$

$$\frac{L(t+h) - L(t)}{h} \approx \left| \frac{r(t+h) - r(t)}{h} \right|$$

Let $h \rightarrow 0$. $L'(t) = |r'(t)|$

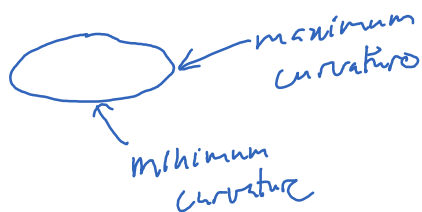
Thus, $L(t) = \int_a^t |r'(t)| dt$

Curvature:

$$k = \left| \frac{dT}{ds} \right| = \frac{|r'(t) \times r''(t)|}{|r'(t)|^3}$$

Ex Find the curvature of a circle with radius R .

Ex Find the curvature of an ellipse.



* The motion problem:

position, velocity, speed, acceleration