

Math 235 Lab 2 Sample

Your Names Here

September 30, 2009

In this discussion, we define a curve in the plane via a set of parametric equations,

$$x(t) = 3 \sin(2\pi t) - 2 \cos^5(2\pi t) \quad y(t) = \cos(2\pi t) - 3 \sin(2\pi t) \quad 0 \leq t \leq 1$$

1. Plot the curve. Plot the points on the curve where $t = 0, 0.1, 0.2, \dots, 1.0$. Combine the two plots into one using `display`.

SOLUTION: We used the `seq` command to generate the point plot, and then we overlapped our two graphs using `display`. The result is seen in Figure 1.

2. Determine the points (x, y) where the curve crosses the line $x = 1$.

SOLUTION:

3. Determine the points (x, y) where the curve crosses the line $y = 2x$.

SOLUTION:

4. Find the point(s) (x, y) where the tangent line is horizontal. Plot one tangent line together with the curve to illustrate your solution.

SOLUTION:

5. Find the point(s) (x, y) where the tangent line is has slope $-2/3$. Plot one tangent line together with the curve to illustrate your solution.

SOLUTION:

6. Find the point(s) (x, y) where the curve crosses itself.

SOLUTION:

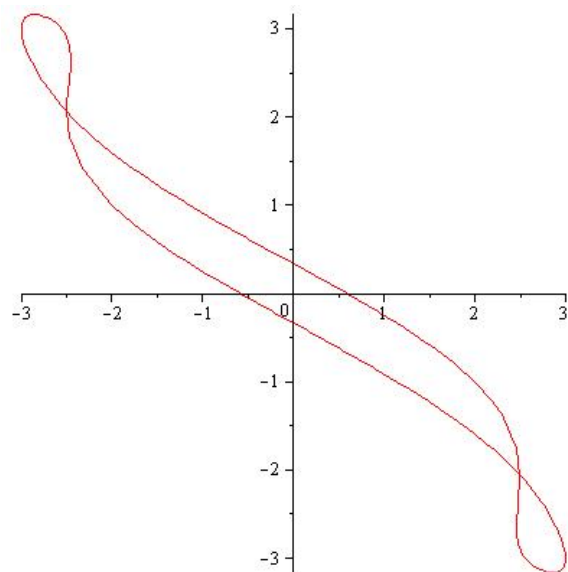


Figure 1: The graph for Question 1 gives the parametric equations as a plot in the (x, y) plane.

7. Extra Credit: Find the angle in degrees between the two branches of the curve.