MATH 164, Spring 2001 **Due Date:**_____ **Name(s):** _____

Project 11.1a: Parametrized Curves

Objective

To illustrate how Maple can be used to plot parametrized curves.

Narrative

If you have not already done so, read Section 11.1 of the text.

To plot the planar curve whose parametric equations are $x = x(t), y = y(t), t \in [a, b]$ using Maple, use the command `plot([x(t),y(t),t=a..b])`. To plot this curve on a set of coordinate axes whose aspect ratio is 1, use the command `plot([x(t),y(t),t=a..b],scaling=constrained)`.

Task

1. Type the command lines below into Maple in the order in which they are listed. These commands are aimed at plotting the graphs of the parametric equations:

   a) $x = 8t - 3, y = 2 - t, t \in [0, 1]$

   b) $x = 5\sin t, y = 3\cos t, t \in [0, 2\pi]$

   c) $x = \sin 3t, y = \sin 4t, t \in [0, 2\pi]$

   d) $x = t + \sin 3t, y = t + \sin 4t, t \in [-2\pi, 2\pi]$

   e) $x = \cos t, y = \sin(t + \sin 5t), t \in [-2\pi, 2\pi]$

   Your lab report will be a hard copy of your typed input and Maple's responses.

```
> # Project 11.1a:  Parametrized Curves
> restart;
> plot([8*t-3,2-t,t=0..1],scaling=unconstrained,color=black);
> plot([5*sin(t),3*cos(t),t=0..2*Pi],scaling=constrained,color=red);
> plot([sin(3*t),sin(4*t),t=0..2*Pi],scaling=constrained,color=blue);
> plot([t+sin(3*t),t+sin(4*t),t=-2*Pi..2*Pi],scaling=constrained,color=green);
> plot([cos(t),sin(t+sin(5*t)),t=-2*Pi..2*Pi],scaling=constrained,color=magenta);
```

2. Create a graphic of a curve described by a set of parametric equations other than those addressed above, that you find interesting. (See the Comment below.)

Comments

The ability to graph parametric curves so easily in Maple, and the fact that there are few restrictions on what makes the graph of a set of parametric equations interesting, take the graphing of parametric equations from a topic in Calculus to an art form. It's interesting, for example, to see how changes to a given set of parametric equations affect the graph of the curve, or what happens when you try to invent something of your own. Remember: anything goes! And, in general, the more complex your equations the more interesting its graph will likely be!