

HW Exercises for Section 6: Equations II

Recall Problem #3 of the HW problems for Section 4:

Exercise #3 of HW for Sec 4..

(a) Use "fsolve" to find a (numerical approximation to a) solution of the nonlinear system of equations

$$\begin{aligned}x^2 + y^4 &= 1 \\ \cos(x) + \sin(y) &= 1\end{aligned}$$

Remember to give fsolve a *set* of equations (curly brackets), NOT either a *sequence* (no brackets) or a *list* (square brackets) of equations.

(b) Without doing any computation, find a second solution that Maple didn't notice (in the next HW set we'll use Maple's advanced plotting capabilities to see that the solutions you've found here are the *only* ones).

(c) To force fsolve to find the second solution, you can specify starting points for the solution algorithm. Try something like this:

```
> fsolve({eqn1,eqn2},{x=1,y=1});
```

1. Continuing this exercise: use "implicitplot" to see if there are more solutions: first try x and y between -10 and 10. How many solutions seem to be indicated? (Remember to first execute the command "with(plots)" to load the package containing "implicitplot".)

2. Explain why does the curve represented by the equation $\cos(x) + \sin(y) = 1$ seems to have infinitely many "components".

3. On a separate plot, narrow down the range of x and y so your plot of both equations is restricted to just one "component" of the curve in #2.