Setup of xmaple
for lab work in
Mathematics 5410

1. Start maple with the command xmaple. A window labeled
`Maple XXX`
should appear. Size it to 3/4 of the screen.

2. Under *Options* on the upper menu bar, choose *Plot display* and then *inline*.

3. On the second line below the menu bar of xmaple, select the text size for the screen as the second *magnifier* from the left. This size also affects printouts on the laser printer.

4. Test the setup with the following plot code:

```
plot(sin(x),x=0..Pi);
```

Warning: pi, PI, Pi are all different in maple. Syntax and case are important.

5. Test the help command with

```
?plot
```

Get rid of the help window using keyboard command ctrl-F4.

Example. Plot the solution curves on $t = -2$ to $t = 2$, $y = -3$ to $y = 3$, going through the points

$(0, 2)$, $(0, 0)$, $(0, -2)$

over a direction field on a 10 by 10 grid, for the differential equation

$y' = -y + 3t$.

Solution: The maple commands which make the plot appear below. This is basically a typing lesson from the maple documentation for DEtools.

```
with(DEtools):
de:=diff(y(t),t)=-y(t)+3*t:
Grid:=dirgrid=[10,10],arrows=medium,thickness=2:
Ivps:=[[y(0)=2],[y(0)=0],[y(0)=-2]]:
Rectangle:=t=-2..2,y=-3..3:
DEplot(de,y(t),Rectangle,Ivps,Grid);
```

If `Ivps` is removed, then the commands produce only a direction field. Plot options `arrows=NONE, color=BLACK, dirgrid=[15,15]` are useful: find out what they do by experiment.

For the problems below, submit a single printout of a maple worksheet. Label the problems by number in the worksheet. Submit by the end of this week.

Problem 1. Repeat the example for differential equation

$y' = y + \cos t$.

Problem 2. Repeat the example for differential equation

$y' = \sin(ty)$.

Problem 3. Repeat the example for differential equation

$y' = \sin(t + y)$.

Problem 4. Repeat the example for differential equation

$y' = \sin(2\pi y/(1 + y^2))$

on the rectangle $t = -5$ to $t = 5$, $y = -2$ to $y = 2$.

Problem 5. Find the equilibrium solutions in Problem 4 above, inside the given rectangle. Check the answer against the `maple` solver called `fsolve`, which uses this syntax:

```
f:=u->sin(2*Pi*u/(1+u^2)):
fsolve(f(u)=0,u,-2..0);
fsolve(f(u)=0,u,0..2);
```