

# 4205 Homework #1

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## 1 Part I

Go online or to your physics/chemistry/math professor and find one scientific application that uses first order partial differential equations and describe it to me!

## 2 Part II

Find all solutions to each of the following using the methods demonstrated in class.

1.  $4u_t - 3u_x = 0$
2.  $4u_t - 3u_x = xt$
3.  $4u_t - 3u_x = xt, u(x, 0) = \cos(4x)$

## 3 III

Animate your solution of Part II - 3 using Maple.

The Basics: To animate a 3-d plot:

1. `with(plots):`
2. `animate(plot3d,[[[x,t,u(x,t)],x=a..b,t=c..d],d=c..e,frames=x);`

The last line animates the coordinate  $(x,t,u(x,t))$  for  $x$  in  $[a,b]$  as  $t$  moves from  $c$  to  $e$ . The frames command is about resolution of your animation, and  $x$  defines the number of frames you would like. 200 is standard but can be much more based on need. Be weary, high frames can result in long compile times.