Homework #5: Phys 3320: Prof. Olness Fall 2015

Due Monday November ...

I've not set up example Mathematica files; refer to my book, or see me.

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1) By hand, solve the 1-dimensional wave equation: (I recommend you use Sin terms):

$$\partial_t^2 f(x,t) = c^2 \, \partial_x^2 f(x,t)$$

Assume f(x,t)=0 for x=0 and x=π.

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2) Using Mathematica:

- Plot solution for t=0 for the first 5 modes :
- Animate the solution as a function of time.
  (Set it up so you can choose the mode "k" and start the animation.)

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3) Start from Maxwell's equations and derive the wave equation for E and B.
Then compute the speed of light c using μ_0 and ϵ_0.

Homework #6: Phys 3320: Prof. Olness Spring 2015

Due Monday December

I've not set up example Mathematica files; refer to my book, or see me.

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1) By hand, solve the 2-dimensional wave equation: (I recommend you use Sin terms):

$$\partial_t^2 f(x,y,t) = c^2 \, \partial_x^2 f(x,y,t) + c^2 \, \partial_y^2 f(x,y,t)$$

Assume f(x,y,t)=0 for x=0 and x=π, and for y=0 and y=π,

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2) Using Mathematica:

- Plot solution for t=0 for the first few modes :
- Animate the solution as a function of time.

  (Set it up so you can choose the mode "k_x" and "k_y" and start the animation.)