

KING FAHD UNIVERSITY of PETROLIUM and MINERALS
Physics Department
Mathematical Physics (Phys-571)
Fall 2013

Issued: 1-9-2013

Assignment # 1

Due date 5-9-2013

As a warming up:

A- Choose a differential equation your own related to physics*, and do it using MATHEMATICA.

*could be: Falling body with air resistance, projectile motion, damped pendulum, planet under the gravitational attraction of the sun, oscillation, etc

B- Choose any second order differential equation your own, better is related to physics**, and do the following:

1- Solve it using the power series expansion $y(t) = \sum_{n=0}^{\infty} a_n t^n$ to have the form

$$y(t) = y_1(t) + y_2(t) .$$

2- With the suitable B.C., find and plot the solutions $y_1(t)$ and $y_2(t)$.

3- Use MATHEMATICA to check your answer.

**could be: Airy, Hermit, etc.

MATHEMATICA Books

- 1- Mathematica, Demystified, by Jim Hoste, McGraw Hill (2009)
- 2- Mathematica, Schaum's outlines, by Eugene Don, McGraw-Hill (2009)
- 3- Mathematica by examples, by M. L. Abell and J. P. Braselton, AP Professional (1994)
- 4- Mathematica for Physics, by R. Zimmerman and F. Olness, Addison-Wesley (1995)