MA/PHY506 Fall 2018
Problem Set 2
DUE: Friday, 14 September 2018

1. Find real basis of the solution space of the ODE: $y'' + 2y' + 2y = 0$. Find the unique real solution to this ODE with initial conditions: $y(x = 0) = 1$ and $y'(x = 0) = 2$.

2. Solve the ODE $x''(t)+\omega_0 x(t) = 0$ using the power series method. Find the recursion relation for the coefficients in the expansion $x(t) = \sum_{j=0}^{\infty} a_j t^j$. Solve the recursion relation for two linearly independent solutions.

3. Find a basis to the solution space of

$$y''' - 2y'' - y' + 2y = 0$$

by guessing an exponential solution.