**11 October 2019:**

**Eular notation:**

**Initial value problem for higher order diff. equation:**

Example,

We need as much initial value as the order of the equation

***Conditions types:***

1. Dirichlet conditions:
2. Neumann conditions:
3. Mixed conditions:

Example:

Consider, . The solution is

1. We have BVP (boundary value problem): , find and

For c1:

For c2:

where C is any real number, infinitely many solutions

1. We have BVP:

, The solution is unique

1. BVP:

So, there is no solution because it doesn’t satisfy the initial condition

**Operators:** operators are functions for which their domain is another function. Noted with the letter D. And their derivative is with a domain where and are functions.

Example:

Example:

Let . Write as diff equation :

Example:

Given ODE

* Find differential operator such that

Example:

Since are solutions. We can write the general solution as

**Linear dependence:**

1. Consider ,

, So trivial solution and thus they are linearly independent

Now we verify with Wronskian matrix:

So, they are linearly independent because Det doesn’t equal 0.