

A Treatise on Differential Equations

Syllabus Number

2G204

Basic Major Subjects

Requisites 2 credit

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1. Course Description

Students comprehend that what kind of phenomena a differential equation expresses, what mean it has and what solution it gives. Then students study how to solve these differential equations.

Students deal with following contents.

1. basic of infinitesimal calculus

2. first-order ordinary differential equation : separable, exact differential, linear

3. second-order ordinary differential equation

Students can acquire knowledge about DP1 in this class.

2. Course Objectives

In order to express scientific and engineering phenomenon, researcher or engineer need to make differential equations which have independent variables such as time, space and so on. And then they need to solve them.

So goal of this class is that students can solve basic ordinary differential equation.

3. Grading Policy

Attendance more than two thirds, midterm exam (40%) and term end exam (60%).

The students will get simple explanations after these exams.

4. Textbook and Reference

Textbook

Text : ISBN978-4-563-01124-6

5. Requirements(Assignments)

Students need knowledge about following subjects. So, if students are not good at these subjects they must read the text or reference book about the subject and write in a notebook for preparation (2.0 hours). After the lecture will be ended, practice the exercises in text for review (1.0 hours).

1. exponential function

2. logarithmic function

3. trigonometric function

4. complex number

5. infinitesimal calculus

6. Note

7. Schedule

- [1] Samples of differential equation for scientific and engineering problems
- [2] Solution of first-order ordinary differential equation (1) : separable (use of formula of the solution)
- [3] Solution of first-order ordinary differential equation (2) : separable (homogeneous form)
- [4] Solution of first-order ordinary differential equation (3) : constant coefficients linear ordinary differential equation (use of formula of the solution)
- [5] Solution of first-order ordinary differential equation (4) : constant coefficients linear ordinary differential equation (method of undetermined coefficients)
- [6] Solution of first-order ordinary differential equation (5) : common linear ordinary differential equation (use of formula of the solution)
- [7] Solution of first-order ordinary differential equation (6) : common linear ordinary differential equation (method of variation of constants)
- [8] Summary of the former part, Midterm exam
- [9] Solution of first-order ordinary differential equation (7) : exact differential
- [10] Solution of second-order ordinary differential equation (1) : general solution of homogeneous equation 1
- [11] Solution of second-order ordinary differential equation (2) : general solution of homogeneous equation 2
- [12] Constant coefficients high order homogeneous linear differential equation
- [13] Solution of second-order ordinary differential equation (3) : solution of inhomogeneous equation (method of undetermined coefficients)
- [14] Solution of second-order ordinary differential equation (4) : solution of inhomogeneous equation (method of variation of constants)
- [15] Summary, Term end exam