

Scanned Documents

Name: Anil Chandra Patel

Roll No: 121020031002

Dept: Civil Engineering

Assignment:

Q1. Define mathematical modeling.

Mathematical modeling is a mathematical representation of system and simulation of a system which involves setting model and obtaining its output results at different values of its input variables. In the model results is changed from one value to another.

Q2. Methods of obtaining a model

- Differentiation
- Use of balance law

Q3. Solution

$$T(0) = 10^\circ$$

$$T(1) = 20^\circ$$

$$\text{Initial Temp} = 20^\circ = T_0$$

$$\frac{dT}{dt} = k(T - T_0)$$

$$\frac{dT}{T - T_0} = k dt$$

$$\int \frac{dT}{T - T_0} = \int k dt$$

$$\ln(T - T_0) = k t + C$$

$$T - T_0 = e^{k t + C}$$

$$k t + C = \ln(T - T_0)$$

$$k t = \ln(T - T_0) - C$$

$$T - T_0 = e^{\ln(T - T_0) - C}$$

$$T - T_0 = e^{\ln(T - T_0)} \cdot e^{-C}$$

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