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Assignment

a) Define Mathematical Modelling
Mathematical modelling is defined as the act of describing a system and its process using mathematical concepts and language.

b) Outline two methods of obtaining mathematical Model for engineering system
-) Transition from the physical situation (physical system) to its mathematical formulation (its mathematical model)
-) Solution by a mathematical method

c) A thermometer that initially reads 10°c is used to measure the temperature of a system. The temperature of the thermometer is discovered to be 20°c after 5 mins of insert it into the system, if the actual temperature of the system is 25°c.
i) develop a model for the system
ii) simulate the developed model for time t=0 to t=60 mins using a step time of 1 min with the aid of Microsoft excel
iii) obtain the dynamic response of the system with the aid of Matlab without using Sysys command, for t=0 to t=60 min using a step of 1 min

b) using a thermo
steady-state
b) Using the deve
the temperature o

c) let T(t) be the
actual temperat
$\frac{dT}{dt} = k(T-T$

The D is varia
$\frac{dT}{dt} = k \cdot$
(T-TA)
integrating bo

$\int \frac{dT}{(T-TA)} = \int k$
$\ln(T-TA) = k$
$T-TA = e^{kt+c}$
$T-TA = e^{kt} \cdot$
$C = e^{c}$ ---
$T(t) = TA + C$

To find C, giv
$T(t) = TA + Ce$
$10 = 25 + c$
$c = 10 - 25$
$= -15$

$\therefore T(t) = 25 - 15$