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DIFFERENTIAL EQUATIONS USING SOME KIND OF PHYSICIST ISSUES SOLVE

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ABSTRACT
It is no secret to anyone how important the role of the differential equation is in every field and aspect in the era of current technologies, and the field of physics is no exception. In this article, solving physical problems using differential equations and a method of modeling some physical processes, i.e. the increase and decrease of atmospheric pressure depending on height, is shown.
KEY WORDS: *specific derivative, atmospheric pressure, density, temperature, gain, amount of heat, height, resistive force, material point,*

INTRODUCTION

Let the body with constant mass m and heat capacity c have a temperature T_0 at the initial moment. The temperature of the environment is constant and equal to T,$T_0 > T_m$ The heat given by the body in an infinitely small time dt, demand the law of cooling of the body, taking into account that it is proportional to the difference between the temperature of the body and the environment around it, as well as to time (according to Newton's law).

Solving.

During cooling, the temperature of the body decreases from T_0 to T_m Let the temperature of the body be equal to T at time t.

$$dQ = -a(T - T_m)dt$$

to Eq equal to is, where a= const proportionality coefficient. Second on the other hand, the body is at temperature T $T_m$is equal to $dQ = mcdT$the amount of heat it gives when it cools down to temperature $Q = mc(T - T_m)$.

Now dQ for found each both expression equal to the following in appearance differential to Eq we will come , $mcdT = -a(T - T_m)dt$the variables of this differential equation we separate

$$\frac{dT}{T - T_m} = -\frac{a}{mc}dt$$

Then above equality each two side integral, differential the equation if we solve the following to look will come

$$\int \frac{dT}{T - T_m} = \int -\frac{a}{mc}dt + C$$

$\ln(T - T_m) = -\frac{a}{mc}t + \ln C$ or $T - T_m = Ce^{-\frac{a}{mc}}$ to equal to the fact that come comes out $t = 0$we find that using the initial condition $T - T_m$in$T - T_0$

$$T = T_m + (T_0 - T_m)e^{-\frac{at}{mc}}$$

in appearance will $a$be direct assignment of the coefficient or as a condition, for example, $t = t_1$da$T = T_1$ through to be given known .

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this case ,$T_1 - T_m = (T_0 - T_m)e^{-\frac{at_m}{mc}}$ from the equation below to equality have we will be

$$e^{-\frac{a}{mc}} = \left(\frac{T_1 - T_m}{T_0 - T_m}\right)^{\frac{1}{t_1}}$$

From this apparently body _ _ and his around environment temperatures between to the difference, as well to time proportional that (Newton to the law according to) attention received without of the body the cold the law equation the following consequential appearance can it is

$$T = T_m + (T_0 - T_m)\left(\frac{T_1 - T_m}{T_0 - T_m}\right)^{\frac{1}{t_1}}$$

2. TASK

The arrow is of thickness h to the fence v_0 initial speed with come in and see him v_1 speed with piercing Let it come out. Block it resistance power shoot speed per square proportional if so, of the body obstacle inside movement find the time T.

Solving.

If material of the point movement speed, power effect which line in the direction of if so, he without material of the point movement right linear will be.Moving material of the point movement graph example ease for on the Ax axis (abscissas axis) accept we do. Newton's second in the law point of movement differential equation harvest we do : $\frac{mdv}{dt} = X(1)$ here$\frac{dv}{dt}$ acceleration ($v$derivative of speed by time t). m-moving n point mass , X-the magnitude of the force. This equation is also a progression in which all points of the body move at the same time also describes the action.

Newton's second to the law read accordingly movement differential equation

$$m\frac{dv}{dt} = -kv^2(2)$$

to look yes, that's it on the ground Minus hint of the wall resistance power shoot to the speed opposite direction for obtained. Eq. (2). variables separable differential is an equation. Variables if we separate, the following equality harvest we do :

$$\frac{dv}{v^2} = -k_1 t, \qquad k_1 = \frac{k}{m}$$

In this

$$-\frac{1}{v} = -k_1 t - C$$

or

$$\frac{1}{v} = k_1 t + C$$

to equalities have we will be. Integration the constant is C $t = 0$start at $v = v_0$_ out of necessity we define :$C = \frac{1}{v_0}$

In that case

$$\frac{1}{v} = k_1 t + \frac{1}{v_0}$$

if $t = T\_v = v_1$ If so, it is being searched for Ttime is found from the above equation, i.e

$$T = \frac{1}{k_1}\left(\frac{1}{v_1} - \frac{1}{v_0}\right)(4)$$

Now we express $k_1$the magnitude by h, v_0 and v_1. For this, we write (2) as follows,

$$\frac{dx}{dt} = \frac{v_0}{1 + k_1 v_0 t}$$

in this $v$velocity, $\frac{dx}{dt}$replaced by , we find x by integrating it,

$$x = \frac{1}{k_1}\ln(1 + k_1 v_0 t) + C_1$$

x=0 at t=0 (arrow to the wall entry) and therefore for $C_1 = 0$, $t = T$and $x = h$(arrow from the wall output), so $h = \frac{1}{k_1}\ln(1 + k_1 v_0 T)$ becomes .(4) from Eq the following equality comes :

$$v_1 = \frac{v_0}{1 + k_1 v_0 T}$$

From this $\frac{v_1}{v_0}$if we find

$$\frac{v_1}{v_0} = \frac{1}{1 + k_1 v_0 T}$$

above from equality $h$we find the expression of

$$h = \frac{1}{k_1}\ln\left(\frac{v_0}{v_1}\right)$$

from this

$$\frac{1}{k_1} = \frac{h}{\ln\left(\frac{v_0}{v_1}\right)}$$

Above from equality found $\frac{1}{k_1}$ the following expression to Eq we put :

$$\frac{1}{v} = k_1 t + \frac{1}{v_0}$$

this equation Twe create the equation for finding time as follows:

$$T = \frac{h}{\ln\left(\frac{v_0}{v_1}\right)}\left(\frac{1}{v_1} - \frac{1}{v_0}\right)$$

CONCLUSION

Medium school physics and academic in lyceums, some physicist processes to the students understandable to be for his mathematician equation to bring to the goal according to will be. That's it with together to action circle of issues mathematician interpretation in practice example and problem solving for very hand will come

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