Mar 16

Dear Bill

It has just occurred to me that you may not have the time to wade through all the guff that people send you and that a concise summary of each letter might be in order. This I will plan to do, unless you say it is unnecessary. I thought of this when reading Petersens paper for I find that one has to do a lot of "wandering around" to get at what he is saying.

Here is my summary of paper A

① A simple pendulum or spring system which is governed by $y = y_0 \sin\left(\sqrt{\frac{k}{m}}\, t + \phi\right)$ $\qquad \omega_0 = \sqrt{\frac{k}{m}}$

when it undergoes damping (with a damping term $K\frac{dy}{dt}$ inserted in the differential equation) will obey

$$y = y_0 e^{-\frac{Kt}{2m}} \sin\left(\sqrt{\omega_0^2 - \left(\frac{K}{2m}\right)^2}\, t + \phi\right)$$

This indicates the first cause of a different period.

② However - there exists another reason why one can get an uncorrected period - and this is, that when one does not measure the start of a period just as the oscillator goes through zero displacement but measures it at a displacement Y then owing to the decay of the vibration the time of measurement will occur at successively later points on the sinusoidal wave. If one refers to this additional time period which gets into the measurement of T as ΔT then

$$\frac{\Delta T}{T} = \frac{K}{2m}\left(Y\right)\left(\frac{T}{2\pi}\right)$$

gives the fractional error introduced by damping.

Ev.

(Over)

(1) No charge for this!!

(2) Do this material which you now have, the way that you want it. I can have it typed but this will cause delays. Also I can go over it and write it up in smoother & more readable form - however this again takes time and I believe that what you want from me is ideas & correct expressions rather than a pretty essay.

(3) I looked up on several catalogues concerning small cheap reset timers - couldn't find any. If you could offhand send me the name of a supplyhouse where I might write to I'd appreciate it.