Shrödinger's Wave Function

Himalaya Satyal[1]

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[1]Rato Bangala School

$$\int_a^b f(x)\mathrm{d}x = \int_0^b f(x)\mathrm{d}x - \int_0^a f(x)\mathrm{d}x$$

Hello I am Himalaya Satyal and this is a research on Shrödinger's wave equations.The Shrödinger Equation is $i\hbar\frac{\partial}{\partial t}|\Psi\rangle = \hat{H}|\Psi\rangle$ By definition,$\int_a^b f(x)\mathrm{d}x = \int_0^b f(x)\mathrm{d}x - \int_0^a f(x)\mathrm{d}x$.

$$E_k + E_P = E_T$$

$$\implies \frac{-\hbar^2}{2m}\nabla^2\Psi(r) + V(r)\Psi(r) = E\Psi(r)$$

$$x \equiv -1 \pmod 5$$

$$i\hbar\frac{\partial}{\partial t}|\Psi\rangle = \hat{H}|\Psi\rangle$$

$$\implies x + 1 \equiv 0 \pmod 5$$

Therefore, $5|x+1$ Let m be a fixed integer greater than 1. The sequence $x_0, x_1, x_2, \ldots$ is defined as follows:

$$x_i = \begin{cases} 2^i & \text{if}\, 0 \leq j \leq m-1; \\ \sum_{j=1}^{m} x_{i-j} & \text{if}\, i \geq m \end{cases}$$

Find the greatest k for which the sequence contains k consecutive terms
divisible by m.
If p is a prime and $p \nmid a$, then $a^p \equiv a \pmod p$ This is known as Fermat's Last Theorem.

A modified version of the Fermat's Last Theorem which gives:
$a^{\phi(n)} \equiv 1 \pmod{n}$ where $\phi(n)$ is the Euler's Totient Function.

Find the greatest k for which the sequence contains k consecutive terms
divisible by m.

$$\oint_{e^{-i\pi}}^{\infty} \sin x \, \mathrm{d}x = ?$$

$$x = x_0 \cos(\omega t)$$

$$\implies \frac{\mathrm{d}x}{\mathrm{d}t} = -\omega x_0 \sin(\omega t) \tag{1}$$

$$v = v_0 \sin(\omega t)$$

$$\implies \frac{\mathrm{d}v}{\mathrm{d}t} = -\omega^2 x_0 \cos(\omega t) \tag{2}$$

$$a = a_0 \cos(\omega t)$$

$$a_0 = -\omega^2 x_0$$

$$x = x_0 e^{-\lambda t}$$

$$\implies \frac{\mathrm{d}x}{\mathrm{d}t} = -\lambda x_0 e^{-\lambda t}$$

$$\frac{\partial x}{\partial t} = \partial \vec{A}$$

$$pV = \frac{1}{3} N m \langle c^2 \rangle \tag{3}$$

$$\Longrightarrow c_{r.m.s} = \sqrt{\langle c^2 \rangle}$$

Now we will look at the workfunction relation between the energy of photon and maximum kinetic energy of a photoelectron emitted.

$$E_{photon} = hf = \mathit{\Phi} + E_{k-max}$$

$$\therefore E_k = hf - \mathit{\Phi} \tag{4}$$

Also $E_k = \frac{1}{2} m v^2$, so:

$$\frac{1}{2} m {v_{max}}^2 = hf - \mathit{\Phi}$$

$$hf = \mathit{\Phi} + \cancelto{0}{E_k}$$

From $\mathrm{eq^n}(4) : hf_0 = \mathit{\Phi}$

0.1 Maxwell's Equations

Differential Form

$$\nabla \cdot \mathbf{E} = \frac{\rho}{\varepsilon_0}$$

$$\nabla \cdot \mathbf{B} = 0$$

$$\nabla \times \mathbf{E} = -\frac{\partial \mathbf{B}}{\partial t}$$

$$\nabla \times \mathbf{B} = \mu_0 \left(\mathbf{J} + \varepsilon_0 \frac{\partial \mathbf{E}}{\partial t} \right)$$

Integral Form

$$\oint_S \vec{E} \cdot \mathrm{d}\vec{a} = \frac{Q_{enc}}{\varepsilon_0}$$

$$\oint_S \vec{B} \cdot \mathrm{d}\vec{a} = 0$$

$$\oint_C \vec{E} \cdot \mathrm{d}\vec{l} = \int_S \frac{\partial \vec{B}}{\partial t} \cdot \mathrm{d}\vec{a}$$

$$\oint_C \vec{B} \cdot \mathrm{d}\vec{l} = \mu_0 I + \mu_0 \varepsilon_0 \int_S \frac{\partial \vec{E}}{\partial t} \cdot \mathrm{d}\vec{a}$$

Now, let's take a look at the activity and half-life of a radioactive substance.

$$-\frac{\mathrm{d}N}{\mathrm{d}t} \propto N$$

$$\implies \frac{\mathrm{d}N}{\mathrm{d}t} = -\lambda N$$
$$\implies \frac{1}{N}\,\mathrm{d}N = -\lambda\,\mathrm{d}t$$

Integrate both sides:

$$\int_{N_0}^{N} \frac{1}{N}\,\mathrm{d}N = -\lambda \int_0^t 1\,\mathrm{d}t \quad \left[\because N = N_0 \text{ at } t = 0\right]$$

$$\implies \Big[\ln N\Big]_{N_0}^{N} = -\lambda\Big[t\Big]_0^t$$
$$\implies \ln N - \ln N_0 = -\lambda t$$
$$\implies \ln\left(\frac{N}{N_0}\right) = -\lambda t$$
$$\implies \frac{N}{N_0} = \mathrm{e}^{-\lambda t}$$
$$\therefore N = N_0\,\mathrm{e}^{-\lambda t}$$
$$\implies \lambda = \frac{\ln 2}{t_{\frac{1}{2}}}$$
$$\therefore t_{\frac{1}{2}} = \frac{\ln 2}{\lambda}$$
$$\therefore A = A_0\,\mathrm{e}^{-\lambda t} \quad \left[\because A = N\lambda\right]$$
$$L = 4\pi\sigma r^2 T^4$$

$$F = \frac{L}{4\pi d^2}$$

$$\lambda_{\mathrm{max}} \propto \frac{1}{T}$$

$$f = f_0 \frac{v}{v \pm v_{\mathrm{s}}}$$

0.2 Taylor Series

$$x \equiv -1 \pmod{5}$$

$$\frac{-\hbar^2}{2m}\nabla^2\Psi(r) + V(r)\Psi(r) = E\Psi(r)$$

$$i\hbar\frac{\partial}{\partial t}|\Psi\rangle = \hat{H}|\Psi\rangle$$

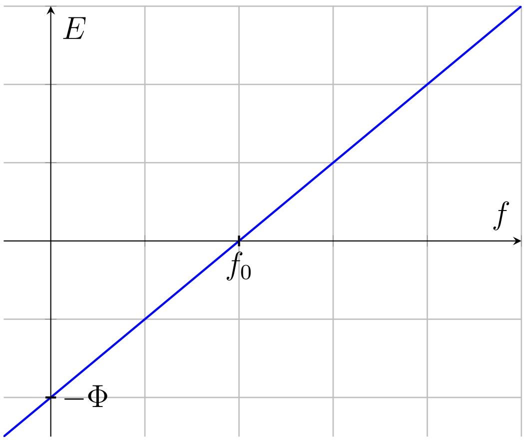
$$y = \begin{cases} 2^i & 0 \leqslant j \leqslant m-1; \\ \sum_{j=1}^{m} x_{i-j} & i \geqslant m \end{cases}$$

$$\begin{bmatrix} 1 & 2 \\ 3 & 4 \end{bmatrix} \begin{bmatrix} 2 & 7 \\ 3 & 4 \end{bmatrix} = \begin{bmatrix} 8 & 15 \\ 18 & 37 \end{bmatrix}$$

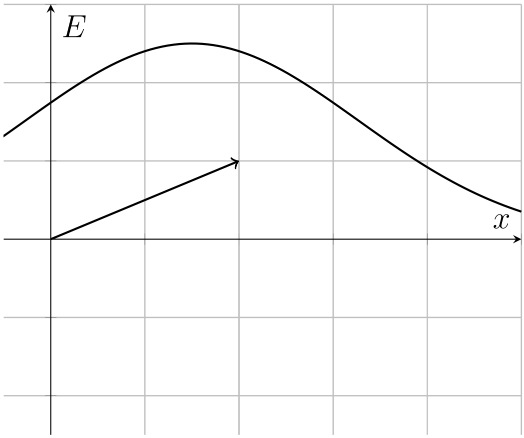
0.3 The photoelectric effect

$$\Phi = \text{K.E.}_{max} + hf$$

$$\therefore E_{k(max)} = \Phi - hf$$



$$E = \begin{cases} 0 & \text{at } 0 \leqslant f \leqslant f_0 \\ hf - \Phi & \text{at } f > f_0 \end{cases}$$

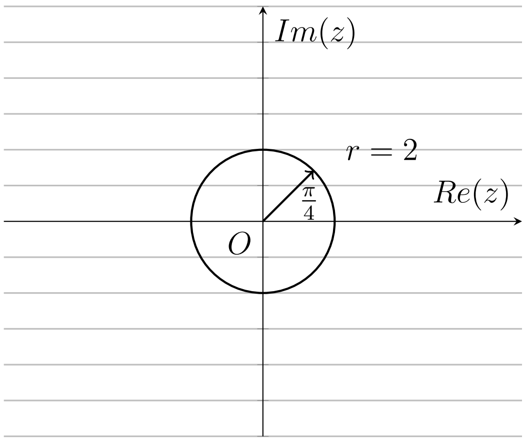


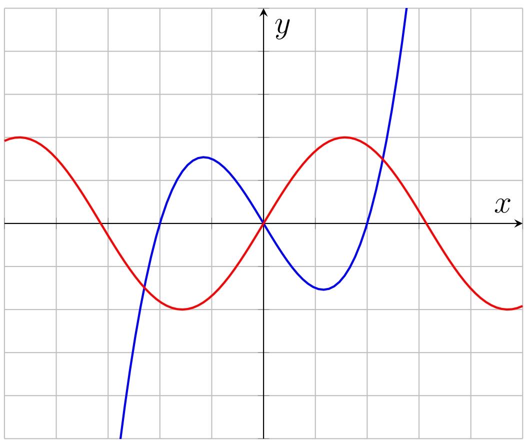
$$E_p = m\Delta\Phi$$

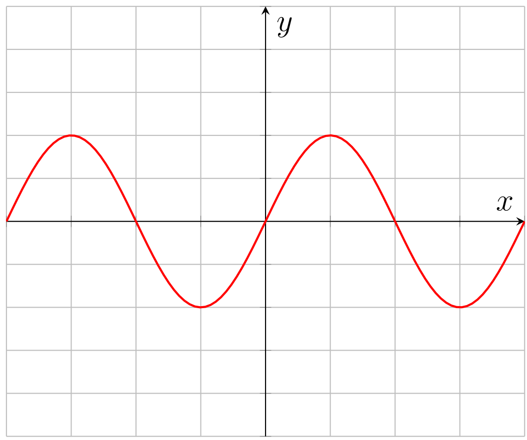
$$E_p = -m\left(\frac{GM}{R_2} - \frac{GM}{R_1}\right)$$

$$\therefore E_p = GMm\left(\frac{1}{R_1} - \frac{1}{R_2}\right)$$

$x - y = 0$


$Im(z)$
$r = 2$
$Re(z)$
$\frac{\pi}{4}$
O


y
x



$$\frac{2}{4}\oint_{\pi}^{7} 2x^2 \,\mathrm{d}x$$