Name: Shradha date: 25-5-2020

Course: signals and systems

USN: 4AL17EC088

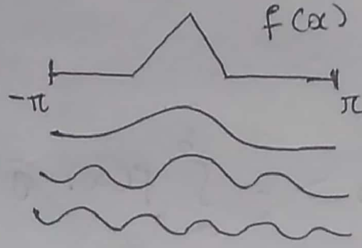
Semester & section: 4th sem 'A'

Topic: ① fourier series ② fourier transform ③ Hilbert transform ④ fourier series using matlab & python

github repository: Shradha-course

fourier series [part 1].

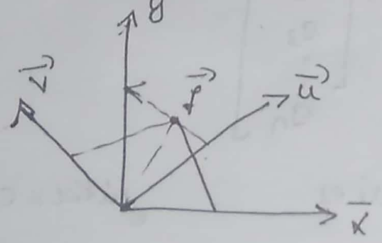
fourier series which is way of approximating [fourier] as sum as infinite sum of sine or cosine of increasing high frequency



$$f(x) = \frac{A_0}{2} \sum_{k=1}^{\infty} \left[A_k \cos(kx) + B_k \sin(kx)\right]$$

$$A_k = \frac{1}{\pi}\int_{-\pi}^{\pi} f(x)\cos(kx)\,dx = \frac{\langle f(x), \cos k(x)\rangle}{\|\cos(kx)\|^2}$$

$$B_k = \frac{1}{\pi}\int_{-\pi}^{\pi} f(x)\sin(kx)\,dx = \frac{1}{\|\sin(kx)\|^2}\langle f(x), \sin(kx)\rangle$$



$$\bar{f} = \langle \bar{f}, \bar{x}\rangle \vec{x} + \langle \vec{f}, \vec{y}\rangle \vec{y}\,\frac{\bar{y}}{\|\bar{y}\|^2}$$

$$= \langle \bar{f}\ \bar{u}\rangle \frac{\bar{u}}{\|\bar{u}\|^2} + \langle \bar{f}, \bar{v}\rangle \cdot \frac{\vec{v}}{\|\bar{v}\|^2}$$

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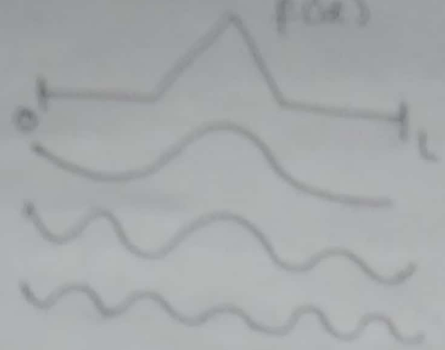
fourier series (part 2)



$f(x) \in L_2([0,L])$

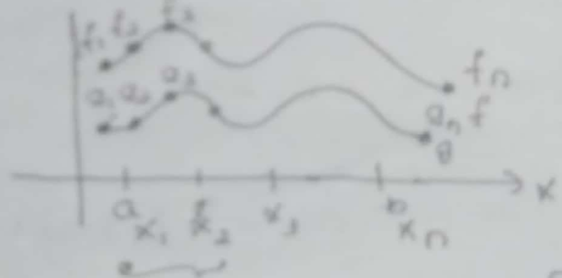
$$f(x) = \frac{A_0}{2} + \sum_{k=1}^{\infty}\left[A_k \cos\left(\frac{2\pi k x}{L}\right) + B_k \sin\left(\frac{2\pi k x}{L}\right)\right]$$

$$A_k = 2/L \int_0^L f(x)\cos\left(\frac{2\pi k}{L}x\right)dx$$

$$B_k = 2/L \int_0^L f(x)\sin\left(\frac{2\pi k}{L}x\right)dx$$

Inner product

$$\langle f(x), g(x)\rangle = \int_a^b f(x)\,\bar{g}(x)\,dx$$



$\langle \underline{f}, g\rangle = g^T f = \boxed{g}\ \boxed{f}$

$= \sum_{k=1}^{n} f_k g_k$

$$\boxed{\langle \underline{f}, g\rangle \Delta x = \sum_{k=1}^{n} f(x_k)\, g(x_k)\,\Delta x}$$

$$\Delta x = \frac{b-a}{n-1}$$

$$f = \begin{bmatrix} f_1 \\ f_2 \\ \vdots \\ f_n \end{bmatrix} \quad g = \begin{bmatrix} g_1 \\ g_2 \\ g_3 \\ \vdots \\ g_n \end{bmatrix}$$

complex fourier series

$e^{ikx} = \cos(kx) + i\sin(kx) \to \psi_k$

$$f(x) = \sum_{k=-\infty}^{\infty} c_k e^{ikx}$$

$$= \sum_{k=-\infty}^{\infty} (\alpha_k + i\beta_k)\left(\cos(kx) + i\sin(kx)\right)$$

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$$\left[c_K = \bar{c}_{-K} \text{ if } f(x) \text{ real}\right]$$

$$\langle \psi_j, \psi_K \rangle = \int_{-\pi}^{\pi} e^{ijx} \, e^{-iKx} \, dx = \int_{-\pi}^{\pi} e^{i(j-K)x} \, dx$$

$$= \frac{1}{i(j-K)} \left[e^{i(j-K)x} \right]_{-\pi}^{\pi}$$

$$= \begin{cases} 0 & \text{if } j \neq K \\ 2\pi & \text{if } j = K \end{cases}$$

fourier series [mat lab]

$$f(x) = \cong \sum_{K=0}^{20} a_K \cos\left(K \frac{2\pi x}{L}\right) + b_K \sin\left(K \frac{2\pi x}{L}\right)$$

$$a_K = \left\langle f(x), \cos\left(K \frac{2\pi x}{L}\right) \right\rangle$$

$$b_K = \left\langle f(x), \sin\left(K \frac{2\pi x}{L}\right) \right\rangle$$

Name: Shraadha | date: 25-5-2020

Course: python | USN 4AL17EC088

Topic: Application 4: Build a personal website with python and flask | Semester & section: IV SEM & A SECTION

Build a personal website with python & flask

* How to create website
* CSS styling
* How to instal git
* HTML templates
* Navigation menu
* mainting the live website
* Troubleshooting