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4AL18EC048

Phython :

chapter 1 : Graphical user interface with Tkinter :

* Intro to Tkinter
* setting up a GUI with widgets
* connecting GUI widgets callback func
* creating a multi-widget GUI

chapter 2 :

* Intro to "Python with database".
* connecting & inserting data to sqlite via phython.
* selecting, inserting, deleting & updating sqlite records
* Intro to postgreSQL psycopg2.
* selecting, inserting, deleting & updating postgresql records.
* Querying data from a MySQL database.

Signal & System

> Fourier series & gibbs phenomena using python.

> Fourier transform:

Fourier series $\rightarrow f(x) = \sum_{K=-\infty}^{\infty} C_K e^{iK\pi x/L}$

$C_K = \frac{1}{2\pi} < f(x)$ ψ_K

$= \frac{1}{2L} \int_{-L}^{L} f(x) e^{-iK\pi x^2} dx$

Fourier transform

$f(x) = \int_{-\infty}^{\infty} \frac{1}{2\pi} \int_{-\infty}^{\infty} f(t) e^{-i\omega t} dt \, e^{i\omega x} dx$

$f(\omega) = \mathcal{F}(f(x)) = \int_{-\infty}^{\infty} f(x) e^{-i\omega x} dx$

$f(x) = \mathcal{F}^{-1}(\hat{A}\omega) = \frac{1}{2\pi} \int_{-\infty}^{\infty} f(\omega) \cdot i\omega x \, d\omega$

> Fourier transform derivatives

$\mathcal{F}\left(\frac{d}{dx} f(x)\right) = \int_{-\infty}^{\infty} \frac{df}{dx} e^{-i\omega x} dx$

$\int^{dg}$ by parts

$= f(x) e^{-i\omega x} \Big|_{-\infty}^{\infty} - \int_{-\infty}^{\infty} f(x) (-i\omega e^{-i\omega x}) dx$

$= i\omega \int_{-\infty}^{\infty} f(x) e^{-i\omega x} dx$

> Fourier transform to convolution:

$(f * g) = \int_{-\infty}^{\infty} f(x-t) g(t) dt$

$\mathcal{F}(f*g) = \mathcal{F}(f)\mathcal{F}(g) = \hat{f}\hat{g}$

$= \frac{1}{2\pi} \int_{-\infty}^{\infty} \int_{-\infty}^{\infty} \hat{f}(\omega) g(y) e^{i\omega(x-y)} dx\, dy$

$= \int_{-\infty}^{\infty} g(y) f(x-y) dy$

$= f * g$

> Laplace transform of 1st order

> Implementation of laplace transform using matlab.

> Appln of z-transform

use to analysis of digital filters

used to simulate convicial system

System design & analytical

> Find the z-transform of sequence using matlab

```
>> syms n;
>>
>> a = n+1;
>>
>> b = ztrans(a);
>> disp(b)
 z/(z-1)+z(z-1)^2
```

>> pretty(b)

$$\frac{z}{z-1} + \frac{z}{(z-1)^2}$$