Date 12/3/21

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Expt. Name fourier transform

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Experiment - 7

Aim :

Observe the effect of amplitude and frequency variation on fourier transform of following waveforms :

1) DC
2) Random Square
3) Laplace Distribution
4) Dirac Delta

Theory :

Fourier transform is simply a method of expressing a function in terms of the sum of its projections onto a set of basis function. Since an 'image' is only defined on a closed and bounded domain, it is integrable over real line.

$$\hat{f}(\xi) = \int_{-\infty}^{\infty} f(x)\, e^{-2\pi i x \xi}\, dx .$$

The result is a Dirac Delta function at $\xi = \xi_0$, which is the only frequency component of the sinusoidal signal $e^{2\pi i \xi_0 x}$.

Apparatus :

1) Java Runtime Environment
2) LabAlive Online Simulator

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Procedure:

- Start the simulator.
- Vary frequency and amplitude, and take the readings for DC, Random square, laplace distribution and dirac delta waveform.

Observations:

1) DC waveform does not change with change in frequency, and have only positive values of amplitude $x(t)$ & $|x(f)|$.

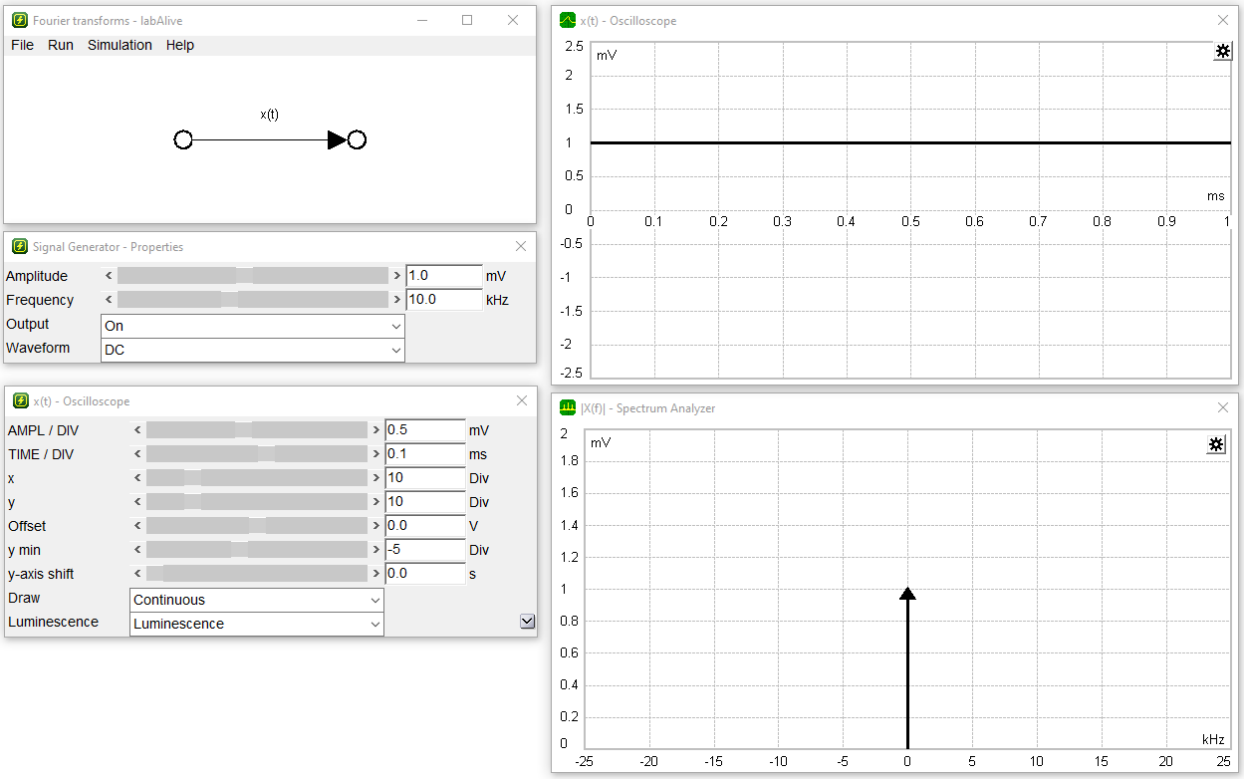
2) Many spectral lines was observed in case of random square wave with different patterns in range of frequency.

3) Amplitude in oscilloscope was greater than the signal waveform in case of laplace distribution curve.

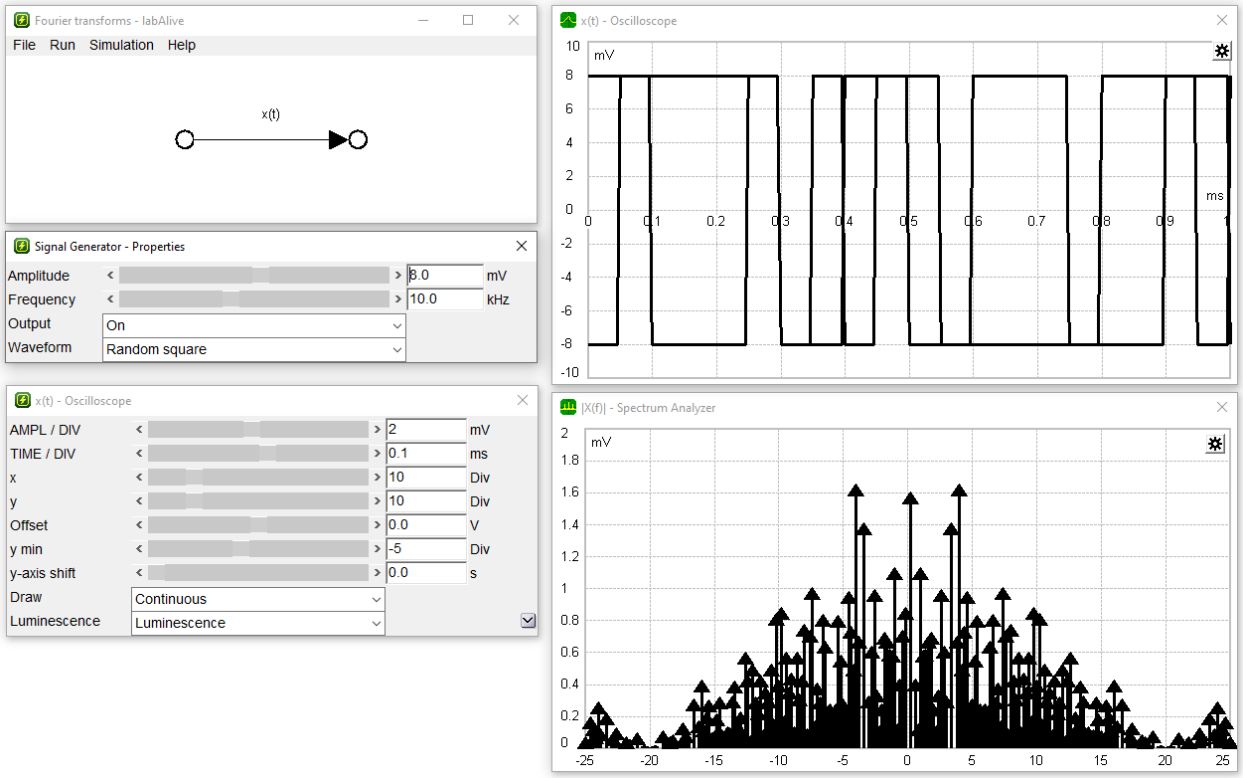
4) In dirac delta wave, amplitude and spectral lines were same in both upper and lower bandwidths and no. of lines also changes with change in frequency value.

Teacher's Signature:

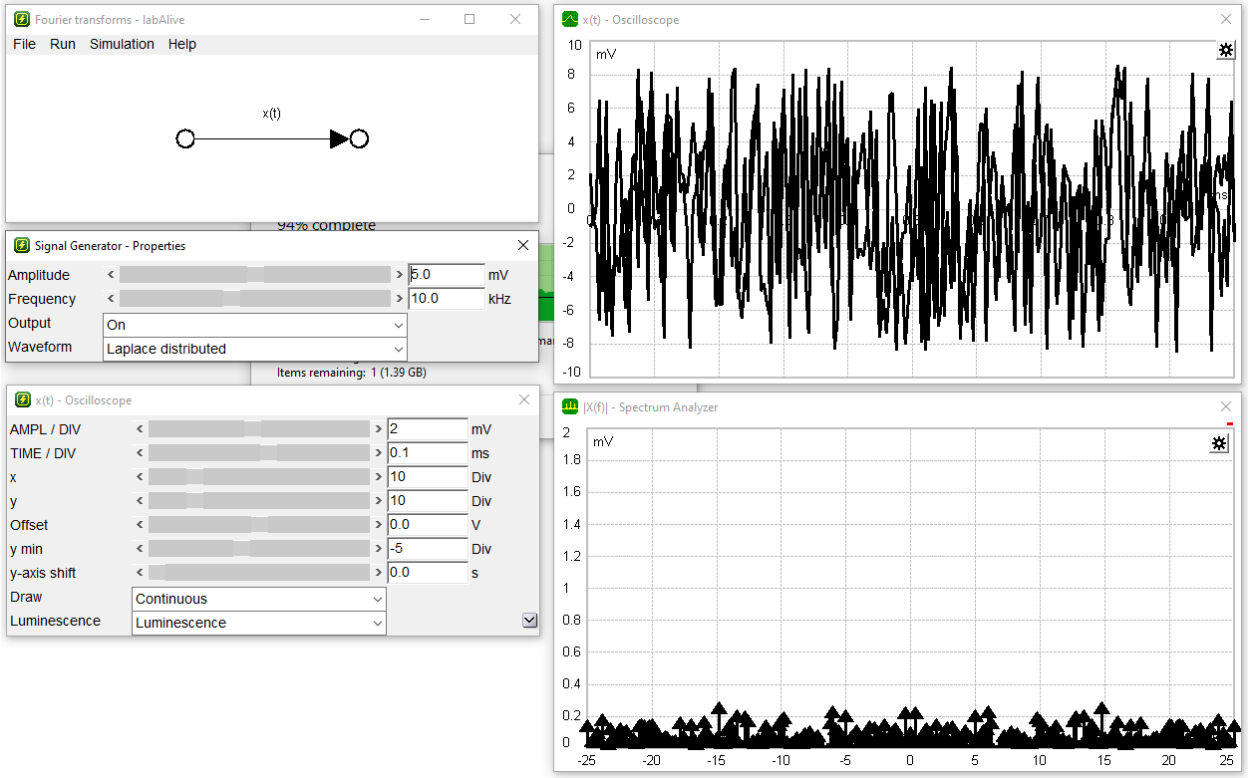
DC



Random Square



Laplace Distribution



Dirac Delta