

Digital Signal Processing Lab

Experiment 5 Autocorrelation, Cross correlation and Spectrum analysis (Discrete DFT)

I Pre-lab Questions

1. Define Autocorrelation?

Autocorrelation is the Correlation of a signal with a delayed copy of itself as a function of delay. Informally it is the similarity b/w observations as a function of time lag b/w them

2. Define Correlation

Correlation is any static relation, whether causal or not, between any statistic through it commonly, refer to which a pair of variables are linearly related.

3. Give the properties of auto Correlation.

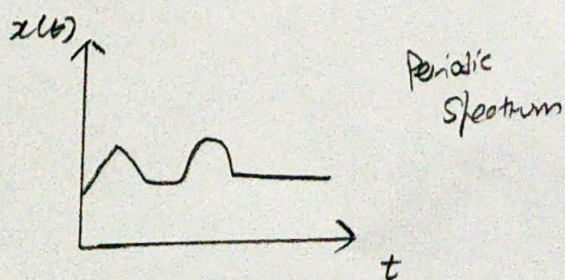
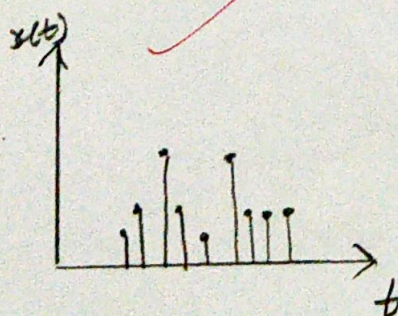
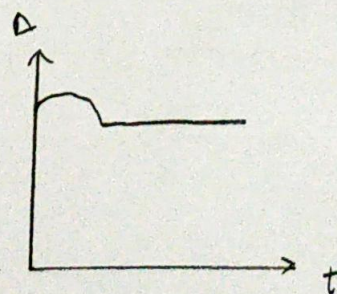
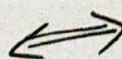
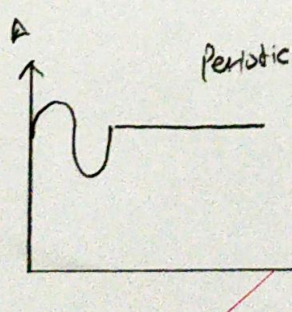
$R(T) = R(-T)$ exhibit conjugate

$R(0) = P$ origin equal to power.

$R(T) = R(f)$ Maximum and intensity properties to T .

$R(T) \xleftrightarrow{FT} S(f)$ Fourier pair and power spectrum

4. Draw the Spectrum for periodic and aperiodic signal



II Post Lab Questions

1. List the difference between Auto Correlation and Convolution?

Soln. Correlation is measurement of similarity b/w two signals sequence.
Convolution is measurement of effect of one signal on the other signal.

2. List the difference between Auto correlation and Cross correlation?

Soln. Cross correlation happens with two different sequence are correlated and auto correlation is correlating the signal by itself.

3. What is the length of the resultant sequence of auto correlation?

Soln. In program, given sequence;
of $L_{input} = 7$ output
 $S_{input} = 9$ output
 $C_{input} = 11$ output.

4. List few applications of Correlation.

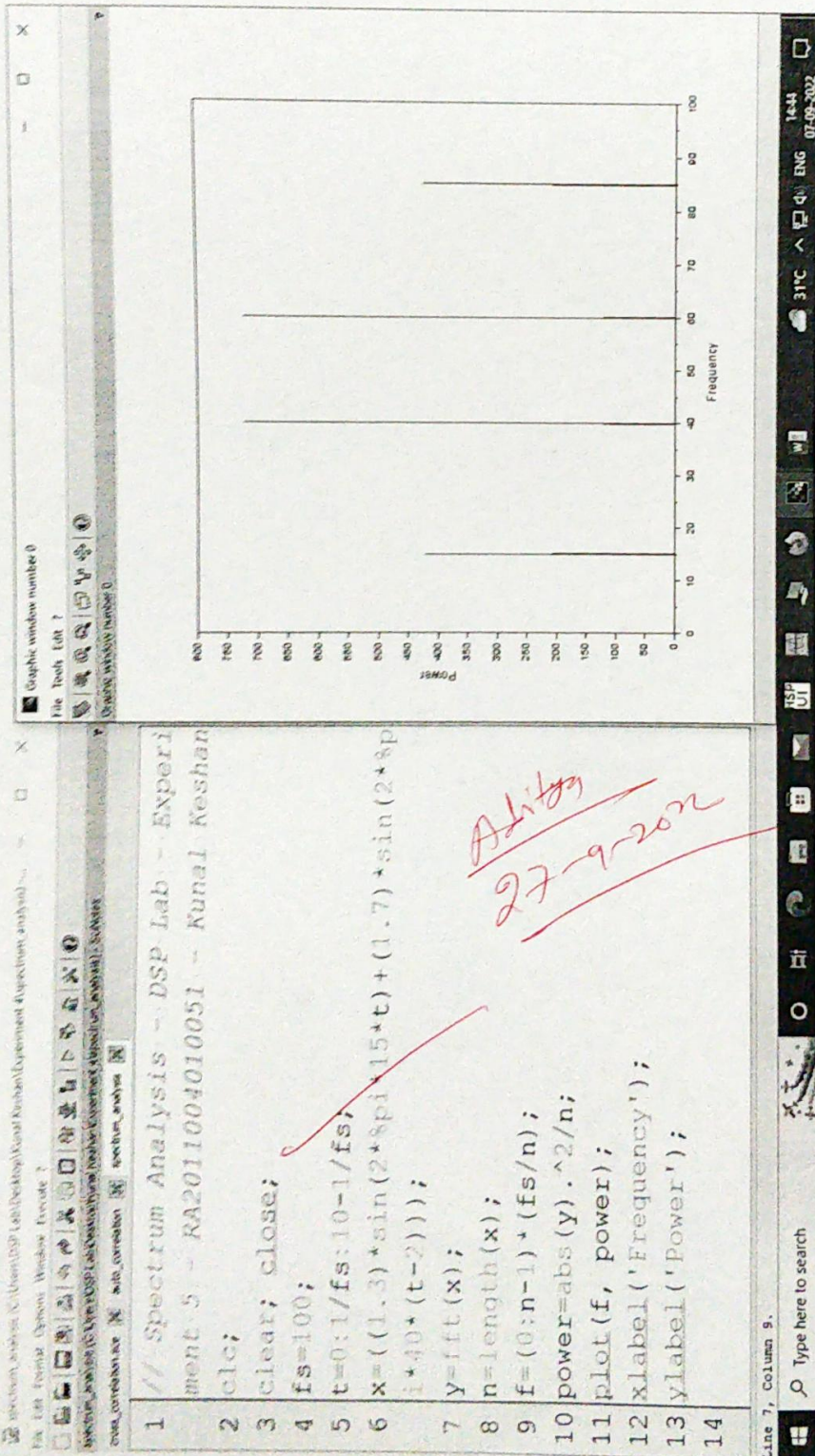
Soln. a) Measuring similarities b/w patterns.

b) Pattern recognition.

c) Signals detection.

d) Feature extraction to improve sensitivity.

Spectrum Analysis



RESULT: Auto Correlation and Cross Correlation of two sequence was Completed using Scilab and the output was verified.