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| **Experiment 3** | |
| **AIM:** | The aim of this experiment is to study magnitude spectrum of the DT signal. |
| **OBJECTIVE:** | 1. Develop a function to perform DFT of N point signal  2. Calculate DFT of a DT signal and Plot Spectrum of Signal.  3. Calculate the effect of zero padding on magnitude spectrum |
| **INPUT SEQUENCE** | **1.**  Length of first Signal N  2.  DT Signal values |
| **PROBLEM DEFINITION:** | (1) Take any four-point sequence x[n].  Find DFT X[k].  Plot Magnitude Spectrum.  (2)  Append the input signal  by four zeros.  Find DFT and plot Magnitude Spectrum  Give your conclusion.  (3)  Expand the  input signal  by inserting alternate  zero.  Find DFT and plot Magnitude Spectrum |
| **RESULT:** | Case-1 : To find DFT of 4 point sequence  Input: x[n] = {1,5,7,9}  Magnitude |X[k]| = {22, 7.33, 6.13, 7.44}    `  Case 2: To find DFT of Zero padded signal  Input: x[k]: {1,5,7,9,0,0,0,0}  Magnitude |X[k]|: {22.1, 17.18, 7.33, 5, 6.13, 4.87,7.18, 17.18}    Case 3: To find DFT of expanded signal  Input: x[k]: {1,0,5,0,7,0,9,0}  Magnitude |X[k]|: {22, 7.23, 6, 7.18, 22, 7.18, 6, 7,23} |
| **CONCLUSION:**   1. DFT converts sequence from Time Domain to Frequency Domain 2. DFT Converts N samples from  time domain to N coefficients in frequency  domain 3. Frequency domain coefficients are  separated by w = 2π/N | |