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| **Experiment 4** | |
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| **AIM** | The aim of this experiment is to implement computationally Fast Algorithms. |
| **OBJECTIVE:** | 1. Develop a program to perform FFT of N point Signal.  2. Calculate FFT of a given DT signal and verify the results using a mathematical formula.  3. Computational efficiency of FFT. |
| **INPUT SPECIFICATIONS:** | 1**.**  Length of first Signal N  2. DT Signal values |
| **PROBLEM DEFINITION:** | (1) Take any four-point sequence x[n].  Find FFT of x[n] and IFFT of {X[k]}.  (2) Calculate Real and Complex Additions & Multiplications involved to find X[k]. |
| **RESULT:** | Case-1 : To find DFT of 4 point sequence  Input x[n] = { 1,2,3,4 } Length N= 4  Output X[k] =  Magnitude |X[k] | = { 10, 2.83, 2, 2.83 }    Case-2 : To find DFT of zero padded signal  Input x[n] = { 1,2,3,4, 0, 0, 0, 0 } Length N=8  Output X[k] =  Magnitude |X[k] |=  = { 10, 7.25, 2.83, 2.72, 2, 2.72, 2.83,7.25 } |
| **CONCLUSION:**  **Conclusion**  1. Computational Efficiency in DFT :  a) Total Real Multiplications = 4N2  b) Total Real Additions = 4N2-2N  2. Computational Efficiency in FFT :  a) Total Real Multiplications = 2N Log2N  b) Total Real Additions = 3N Log2N  3. FFT produces fast results due to ;  a) Less Computations  b) Parallel implementations | |