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| **Experiment 4** | |
| **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 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]. |
| **Experiment and Analysis:** | To find DFT of a 4 point sequence Input x[n]: {5, 6, 7, 8}  Magnitude |X[k]| : {26, 2.82, 2, 2.82 } |

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| **Conclusion:** | 1. Computational Efficiency in DFT:    1. Total Real Multiplications = 4N^^2    2. Total Real Additions = 4N^^2-2N   2. Computational Efficiency in FFT:   1. Total Real Multiplications = 2N\*Log2N 2. Total Real Additions = 3N\*Log2N   3. FFT produces fast results due to:   1. Less Computations 2. Parallel implementations |