**DSIP**

**Experiment 4 – Discrete Fourier Transform**

#include <stdio.h>

#include <conio.h>

#include <graphics.h>

#include <math.h>

int main() {

double ans[50][2];

int x[50];

int N, k, i;

double u, v;

clrscr();

printf("Enter the value of the period: ");

scanf("%d", &N);

printf("Enter the values of the signal\n");

for (i = 0; i < N; i++)

scanf("%d", &x[i]);

for (k = 0; k < N; k++) {

u = 0.0;

v = 0.0;

for (i = 0; i < N; i++) {

u += x[i] \* cos(-(2 \* M\_PI \* i \* k) / N);

v += x[i] \* sin(-(2 \* M\_PI \* i \* k) / N);

}

ans[k][0] = u;

ans[k][1] = v;

}

for (k = 0; k < N; k++) {

u = sqrt(ans[k][0]\*ans[k][0] + ans[k][1]\*ans[k][1]);

if (abs(ans[k][0] - 0.0) < 0.01)

v = 1.0;

else

v = atan(ans[k][1] / ans[k][0]);

printf("K = %d --> (%.2lf + j(%.2lf)) %.2lf <%.2lf>\n", k, ans[k][0], ans[k][1], u, v);

}

getch();

return 0;

}

