C Codes of Project 3

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Project 3

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#include <stdlib.h>

#include <complex.h>

#include <math.h>

double complex func(double complex x){

return (x\*x\*x\*x) - 3 \* (x\*x\*x) + (x\*x) + (x) + 1 ; //Math library has some problem about using of pow so that I wrote equations directly.

}

void muller(double complex p0 , double complex p1 , double complex p2 , double tolerance){

//Setting Values

double complex h1 = p1 - p0;

double complex h2 = p2 - p1;

double complex ro\_1 = (func(p1) - func(p0)) / h1;

double complex ro\_2 = (func(p2) - func(p1)) / h2;

double complex d = (ro\_2 - ro\_1)/(h2 + h1);

//Variables

int i=3;

double complex b;

double complex D;

double complex p;

double complex E;

double complex h;

//Information about equations

printf("p0 = %f , p1 = %f , p2 = %f , tol. = %f\n\n" , p0 , p1 , p2 , tolerance);

printf("No:\t \tPi(x + yi)\t \tf(pi)(x + yi)\n");

printf("\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\n");

while(i<200){

b = ro\_2 + (h2\*d);

D = csqrt(b\*b -4 \* func(p2) \* d);

if( fabs(b - D) < fabs(b + D) ){

E = b + D;

}else{

E = b - D;

}

h = (-2\*func(p2))/E;

p = p2 + h;

printf(" %d.\t\t%f , %f\t\t%f , %f\n",i,creal(p),cimag(p),creal(func(p)),cimag(func(p)));

if( (pow(creal(h),2) + pow(cimag(h),2)) < (tolerance\*tolerance)){

break;

}

p0 = p1;

p1 = p2;

p2 = p;

h1 = p1 - p0;

h2 = p2 - p1;

ro\_1=(func(p1)-func(p0))/h1;

ro\_2=(func(p2)-func(p1))/h2;

d=(ro\_2-ro\_1)/(h2+h1);

i = i + 1;

}

}

int main(){

double tolerance = 0.00001;

muller(0.5 , -0.5 , 0 , tolerance);

printf("\n\n");

muller(0.5 , 1 , 1.5 , tolerance);

printf("\n\n");

muller(1.5 , 2 , 2.5 , tolerance);

return 0;

}