montecarlo

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1.1 Class List

Here are the classes, structs, unions and interfaces with brief descriptions:

Chapter 2

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2.1 File List

Here is a list of all files with brief descriptions:

Chapter 3

Class Documentation

3.1 Complex Class Reference

`#include <complex.h>`

Public Member Functions

- void operator+= (Complex)
- void operator-= (Complex)
- void operator∗= (Complex)
- void operator/= (Complex)
- void operator/= (double)
- Complex (double, double)
- Complex (double)
- Complex ()
- void operator= (Complex)
- void operator= (double)
- Complex conj ()
- double real ()
- double imag ()
- double abs ()
- double arg ()
- double norm ()
- void print ()

Public Attributes

- double r
- double i

Friends

- double abs (Complex)
- double arg (Complex)
- Complex conj (Complex)
- double real (Complex)
- double imag (Complex)
- double norm (Complex)

- Complex polar (double, double)
- Complex exp (Complex)
- Complex log (Complex)
- Complex pow (double, Complex)
- Complex pow (Complex, double)
- Complex root (Complex, double)
- Complex pow (Complex, Complex)
- Complex sqrt (Complex)
- Complex sin (Complex)
- Complex cos (Complex)
- Complex sinh (Complex)
- Complex cosh (Complex)
- Complex operator- (Complex)
- bool operator== (Complex, Complex)
- bool operator!= (Complex, Complex)
- ostream & operator<< (ostream &, Complex &)
- istream & operator>> (istream &, Complex &)
- Complex operator+ (Complex, Complex)
- Complex operator- (Complex, Complex)
- Complex operator* (Complex, Complex)
- Complex operator/ (Complex, Complex)
- Complex operator/ (Complex, double)
- Complex operator""_i (long double)
- Complex operator""_i (unsigned long long)

3.1.1 Detailed Description

Definition at line 9 of file complex.h.

3.1.2 Constructor & Destructor Documentation

3.1.2.1 Complex::Complex (double _r, double _i)

Definition at line 74 of file complex.h.

References i, and r.

3.1.2.2 Complex::Complex (double _r)

Definition at line 81 of file complex.h.

References i, and r.

3.1.2.3 Complex::Complex ( )

Definition at line 88 of file complex.h.

References i, and r.

3.1.3 Member Function Documentation

3.1.3.1 double Complex::abs ( )

Definition at line 256 of file complex.h.

References i, r, and sqrt().

3.1.3.2 double Complex::arg ( )

Definition at line 212 of file complex.h.

References i, and r.

3.1.3.3 Complex Complex::conj ( )

Definition at line 201 of file complex.h.

References i, and r.

3.1.3.4 double Complex::imag ( )

Definition at line 234 of file complex.h.

References i.

3.1.3.5 double Complex::norm ( )

Definition at line 245 of file complex.h.

References i, and r.

3.1.3.6 void Complex::operator*= (Complex *rhs*)

Definition at line 185 of file complex.h.

3.1.3.7 void Complex::operator+= (Complex *rhs*)

Definition at line 175 of file complex.h.

3.1.3.8 void Complex::operator-= (Complex *rhs*)

Definition at line 180 of file complex.h.

3.1.3.9 void Complex::operator/= (Complex *rhs*)

Definition at line 190 of file complex.h.

3.1.3.10 void Complex::operator/= (double *rhs*)

Definition at line 195 of file complex.h.

3.1.3.11 void Complex::operator= (Complex *rhs*)

Definition at line 148 of file complex.h.

References i, i, r, and r.

3.1.3.12 void Complex::operator= (double _r)

Definition at line 142 of file complex.h.

References i, and r.

3.1.3.13 void Complex::print ( )

Definition at line 333 of file complex.h.

References i, and r.

3.1.3.14 double Complex::real ( )

Definition at line 223 of file complex.h.

References r.

3.1.4 Friends And Related Function Documentation

3.1.4.1 double abs (Complex *rhs*) [friend]

Definition at line 260 of file complex.h.

Referenced by abs(), log(), and operator/().

3.1.4.2 double arg (Complex *rhs*) [friend]

Definition at line 217 of file complex.h.

Referenced by arg(), and log().

3.1.4.3 Complex conj (Complex *rhs*) [friend]

Definition at line 206 of file complex.h.

Referenced by operator/().

3.1.4.4 Complex cos (Complex *rhs*) [friend]

Definition at line 327 of file complex.h.

3.1.4.5 Complex cosh (Complex *rhs*) [friend]

Definition at line 317 of file complex.h.

3.1.4.6 Complex exp (Complex *rhs*) [friend]

Definition at line 273 of file complex.h.

3.1.4.7 double imag (Complex *rhs*) [friend]

Definition at line 239 of file complex.h.

3.1.4.8 Complex log (Complex *rhs*) [friend]

Definition at line 279 of file complex.h.

3.1.4.9 double norm (Complex *rhs*) [friend]

Definition at line 250 of file complex.h.

Referenced by norm().

3.1.4.10 bool operator!= (Complex *a,* Complex *b*) [friend]

Definition at line 167 of file complex.h.

3.1.4.11 Complex operator""_i (long double *_i*) [friend]

Definition at line 94 of file complex.h.

3.1.4.12 Complex operator""_i (unsigned long long *_i*) [friend]

Definition at line 98 of file complex.h.

3.1.4.13 Complex operator* (Complex *a,* Complex *b*) [friend]

Definition at line 123 of file complex.h.

3.1.4.14 Complex operator+ (Complex *a,* Complex *b*) [friend]

Definition at line 111 of file complex.h.

3.1.4.15 Complex operator- (Complex *rhs*) [friend]

Definition at line 154 of file complex.h.

3.1.4.16 Complex operator- (Complex *a,* Complex *b*) [friend]

Definition at line 117 of file complex.h.

3.1.4.17 Complex operator/ (Complex *a,* Complex *b*) [friend]

Definition at line 129 of file complex.h.

3.1.4.18 Complex operator/ (Complex *a,* double *b*) [friend]

Definition at line 136 of file complex.h.

3.1.4.19 ostream& operator<< (ostream & *os,* Complex & *c*) [friend]

Definition at line 343 of file complex.h.

3.1.4.20 bool operator== (Complex *a*, Complex *b*) [friend]

Definition at line 159 of file complex.h.

3.1.4.21 istream& operator>> (istream & *is*, Complex & *c*) [friend]

Definition at line 353 of file complex.h.

3.1.4.22 Complex polar (double *r*, double *t*) [friend]

Definition at line 267 of file complex.h.

3.1.4.23 Complex pow (double *a*, Complex *b*) [friend]

Definition at line 285 of file complex.h.

3.1.4.24 Complex pow (Complex *a*, double *b*) [friend]

Definition at line 290 of file complex.h.

3.1.4.25 Complex pow (Complex *a*, Complex *b*) [friend]

Definition at line 295 of file complex.h.

3.1.4.26 double real (Complex *rhs*) [friend]

Definition at line 228 of file complex.h.

3.1.4.27 Complex root (Complex *a*, double *b*) [friend]

Definition at line 306 of file complex.h.

3.1.4.28 Complex sin (Complex *rhs*) [friend]

Definition at line 322 of file complex.h.

3.1.4.29 Complex sinh (Complex *rhs*) [friend]

Definition at line 312 of file complex.h.

3.1.4.30 Complex sqrt (Complex *rhs*) [friend]

Definition at line 301 of file complex.h.

3.1.5 Member Data Documentation

3.1.5.1 double Complex::i

Definition at line 13 of file complex.h.

Referenced by conj(), exp(), imag(), operator∗(), operator+(), operator-(), operator/(), operator<<(), operator=(), operator==(), and operator>>().

3.1.5.2 double Complex::r

Definition at line 12 of file complex.h.

Referenced by conj(), exp(), operator∗(), operator+(), operator-(), operator/(), operator<<(), operator=(), operator==(), operator>>(), and real().

The documentation for this class was generated from the following file:

- include/complex.h

3.2 montecarlo Class Reference

Public Member Functions

- void Pi_Estamtion (int)

Public Attributes

- int Number_of_point
- int Count_inCircle = 0
- vector< Complex > simple_point
- vector< double > pi_Approx
- vector< bool > inCircle

3.2.1 Detailed Description

Definition at line 12 of file main.cpp.

3.2.2 Member Function Documentation

3.2.2.1 void montecarlo::Pi_Estamtion (int *Number_of_point*)

Definition at line 23 of file main.cpp.

References abs(), and i.

Referenced by main().

3.2.3 Member Data Documentation

3.2.3.1 int montecarlo::Count_inCircle = 0

Definition at line 16 of file main.cpp.

3.2.3.2 vector<bool> montecarlo::inCircle

Definition at line 19 of file main.cpp.

3.2.3.3 int montecarlo::Number_of_point

Definition at line 15 of file main.cpp.

3.2.3.4 vector<double> montecarlo::pi_Approx

Definition at line 18 of file main.cpp.

3.2.3.5 vector<Complex> montecarlo::simple_point

Definition at line 17 of file main.cpp.

The documentation for this class was generated from the following file:

- src/main.cpp

Chapter 4

File Documentation

4.1 include/complex.h File Reference

```
#include <iostream>
#include <cmath>
#include <string>
```

Classes

- class Complex

Functions

- Complex operator""_i (long double _i)
- Complex operator""_i (unsigned long long _i)
- Complex operator+ (Complex a, Complex b)
- Complex operator- (Complex a, Complex b)
- Complex operator∗ (Complex a, Complex b)
- Complex operator/ (Complex a, Complex b)
- Complex operator/ (Complex a, double b)
- Complex operator- (Complex rhs)
- bool operator== (Complex a, Complex b)
- bool operator!= (Complex a, Complex b)
- Complex conj (Complex rhs)
- double arg (Complex rhs)
- double real (Complex rhs)
- double imag (Complex rhs)
- double norm (Complex rhs)
- double abs (Complex rhs)
- Complex polar (double r, double t)
- Complex exp (Complex rhs)
- Complex log (Complex rhs)
- Complex pow (double a, Complex b)
- Complex pow (Complex a, double b)
- Complex pow (Complex a, Complex b)
- Complex sqrt (Complex rhs)
- Complex root (Complex a, double b)
- Complex sinh (Complex rhs)

- Complex cosh (Complex rhs)
- Complex sin (Complex rhs)
- Complex cos (Complex rhs)
- ostream & operator<< (ostream &os, Complex &c)
- istream & operator>> (istream &is, Complex &c)

4.1.1 Function Documentation

4.1.1.1 double abs (Complex *rhs*)

Definition at line 260 of file complex.h.

References Complex::abs.

Referenced by operator<<(), and montecarlo::Pi_Estamtion().

4.1.1.2 double arg (Complex *rhs*)

Definition at line 217 of file complex.h.

References Complex::arg.

4.1.1.3 Complex conj (Complex *rhs*)

Definition at line 206 of file complex.h.

References Complex::i, and Complex::r.

4.1.1.4 Complex cos (Complex *rhs*)

Definition at line 327 of file complex.h.

References cosh().

Referenced by exp(), and polar().

4.1.1.5 Complex cosh (Complex *rhs*)

Definition at line 317 of file complex.h.

References exp().

Referenced by cos().

4.1.1.6 Complex exp (Complex *rhs*)

Definition at line 273 of file complex.h.

References cos(), Complex::i, Complex::r, and sin().

Referenced by cosh(), pow(), and sinh().

4.1.1.7 double imag (Complex *rhs*)

Definition at line 239 of file complex.h.

References Complex::i.

4.1.1.8 Complex log (Complex *rhs*)

Definition at line 279 of file complex.h.

References Complex::abs, and Complex::arg.

Referenced by pow().

4.1.1.9 double norm (Complex *rhs*)

Definition at line 250 of file complex.h.

References Complex::norm.

4.1.1.10 bool operator!= (Complex *a,* Complex *b*)

Definition at line 167 of file complex.h.

4.1.1.11 Complex operator"" _i (long double _*i*)

Definition at line 94 of file complex.h.

4.1.1.12 Complex operator"" _i (unsigned long long _*i*)

Definition at line 98 of file complex.h.

4.1.1.13 Complex operator* (Complex *a,* Complex *b*)

Definition at line 123 of file complex.h.

References Complex::i, and Complex::r.

4.1.1.14 Complex operator+ (Complex *a,* Complex *b*)

Definition at line 111 of file complex.h.

References Complex::i, and Complex::r.

4.1.1.15 Complex operator- (Complex *a,* Complex *b*)

Definition at line 117 of file complex.h.

References Complex::i, and Complex::r.

4.1.1.16 Complex operator- (Complex *rhs*)

Definition at line 154 of file complex.h.

References Complex::i, and Complex::r.

4.1.1.17 Complex operator/ (Complex *a,* Complex *b*)

Definition at line 129 of file complex.h.

References Complex::abs, and Complex::conj.

4.1.1.18 Complex operator/ (Complex *a*, double *b*)

Definition at line 136 of file complex.h.

References Complex::i, and Complex::r.

4.1.1.19 ostream& operator<< (ostream & *os*, Complex & *c*)

Definition at line 343 of file complex.h.

References abs(), Complex::i, and Complex::r.

4.1.1.20 bool operator== (Complex *a*, Complex *b*)

Definition at line 159 of file complex.h.

References Complex::i, and Complex::r.

4.1.1.21 istream& operator>> (istream & *is*, Complex & *c*)

Definition at line 353 of file complex.h.

References Complex::i, and Complex::r.

4.1.1.22 Complex polar (double *r*, double *t*)

Definition at line 267 of file complex.h.

References cos(), and sin().

4.1.1.23 Complex pow (double *a*, Complex *b*)

Definition at line 285 of file complex.h.

References exp(), and log().

Referenced by root(), and sqrt().

4.1.1.24 Complex pow (Complex *a*, double *b*)

Definition at line 290 of file complex.h.

References exp(), and log().

4.1.1.25 Complex pow (Complex *a*, Complex *b*)

Definition at line 295 of file complex.h.

References exp(), and log().

4.1.1.26 double real (Complex *rhs*)

Definition at line 228 of file complex.h.

References Complex::r.

4.1.1.27 Complex root (Complex *a,* double *b*)

Definition at line 306 of file complex.h.

References pow().

4.1.1.28 Complex sin (Complex *rhs*)

Definition at line 322 of file complex.h.

References sinh().

Referenced by exp(), and polar().

4.1.1.29 Complex sinh (Complex *rhs*)

Definition at line 312 of file complex.h.

References exp().

Referenced by sin().

4.1.1.30 Complex sqrt (Complex *rhs*)

Definition at line 301 of file complex.h.

References pow().

Referenced by Complex::abs().

4.2 plot/Plot.m File Reference

Functions

- figure (1)
- plot (1:N, x(3,:))
- title ('pi estimate against number of rain drops')
- xlabel ('Number of rain drops')
- figure (2)
- if (x(4, i)==1) plot(x(1
- x (2, i)
- else plot (x(1, i), x(2, i),'.')
- end title ([int2str(i),'drops ', int2str(x(5, i)),'landed in circle, estimating pi as ', num2str(x(3, i))])
- F (i)
- end movie2avi (F,'Pi_Estimation.avi','compression','None','fps', 50)

Variables

- close all
- x = load('Pi_Approx.txt')
- N = length(x)
- hold on for i
- r

4.2.1 Function Documentation

4.2.1.1 F (i)

4.2.1.2 figure (1)

4.2.1.3 figure (2)

4.2.1.4 if (x(4, i) ==1)

4.2.1.5 end movie2avi (F , 'Pi_Estimation.avi' , 'compression' , 'None' , 'fps' , 50)

4.2.1.6 plot (1:N , x(3,:))

4.2.1.7 else plot (x(1, i) , x(2, i) , '.')

4.2.1.8 title ('pi estimate against number of rain drops')

4.2.1.9 end title ( )

4.2.1.10 x (2 , i)

4.2.1.11 xlabel ('Number of rain drops')

4.2.2 Variable Documentation

4.2.2.1 clear all

Definition at line 1 of file Plot.m.

4.2.2.2 i

Initial value:

```
1:N
    figure(2)
```

Definition at line 12 of file Plot.m.

Referenced by Complex::abs(), Complex::arg(), Complex::Complex(), Complex::conj(), Complex::imag(), Complex::norm(), Complex::operator=(), montecarlo::Pi_Estamtion(), and Complex::print().

4.2.2.3 N = length(x)

Definition at line 4 of file Plot.m.

4.2.2.4 r

Definition at line 15 of file Plot.m.

Referenced by Complex::abs(), Complex::arg(), Complex::Complex(), Complex::conj(), Complex::norm(), Complex::operator=(), Complex::print(), and Complex::real().

4.2.2.5 x = load('Pi_Approx.txt')

Definition at line 3 of file Plot.m.

4.3 src/main.cpp File Reference

```
#include <iostream>
#include <random>
#include <vector>
#include <cmath>
#include <fstream>
#include "complex.h"
```

Classes

- class montecarlo

Functions

- int main ()

4.3.1 Function Documentation

4.3.1.1 int main ( )

Definition at line 43 of file main.cpp.

References montecarlo::Pi_Estamtion().

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