

MathProject

1.2

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Chapter 1

File Index

1.1 File List

Here is a list of all files with brief descriptions:

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Chapter 2

File Documentation

2.1 /home/tako/programming/HWW/0_SqEq/include/SqEq.hh File Reference

Macros

- #define `SSEQ_ERROR` 1
return this from main on error
- #define `MAX_ROOT_NUM` 2
maximal munber of roots
- #define `COEFF_NUM` 3
number of coefficients
- #define `EPS` 1e-12
epsilon

Enumerations

- enum `ResType` {
 `RT_ERROR`, `RT_INV_COEFF_ERROR`, `RT_NULLPTR_ERROR`, `RT_VALID`,
 `RT_NO_ROOTS`, `RT_ONE_ROOT`, `RT_TWO_ROOTS`, `RT_INF_ROOTS` }
enum with result types of solve functions

Functions

- bool `read_coeffs` (const char *prompt, double coeffs[`COEFF_NUM`])
Reading 3 coefficients from stdin.
- void `print_res` (int res_type, const double results[`MAX_ROOT_NUM`])
Print squaree equations roots.
- int `solve_sseq` (const double coeffs[`COEFF_NUM`], double results[`MAX_ROOT_NUM`])
Solving square equation.
- int `solve_linear` (double b, double c, double *x_ptr)
Solving linear equation.
- int `is_equal` (double n1, double n2)
Compares two double numbers.
- int `ret_code` (int res_type)
Generate program return code.
- bool `unit_testing` ()
Testing SqEq functions.

2.1.1 Macro Definition Documentation

2.1.1.1 SSEQ_ERROR

```
#define SSEQ_ERROR 1
```

return this from main on error

Definition at line 8 of file SqEq.hh.

2.1.1.2 MAX_ROOT_NUM

```
#define MAX_ROOT_NUM 2
```

maximal number of roots

Definition at line 13 of file SqEq.hh.

2.1.1.3 COEFF_NUM

```
#define COEFF_NUM 3
```

number of coefficients

Definition at line 18 of file SqEq.hh.

2.1.1.4 EPS

```
#define EPS 1e-12
```

epsilon

Definition at line 23 of file SqEq.hh.

2.1.2 Enumeration Type Documentation

2.1.2.1 ResType

```
enum ResType
```

enum with result types of solve functions

Enumerator

RT_ERROR	
RT_INV_COEFF_ERROR	
RT_NULLPTR_ERROR	
RT_VALID	
RT_NO_ROOTS	
RT_ONE_ROOT	
RT_TWO_ROOTS	
RT_INF_ROOTS	

Definition at line 28 of file SqEq.hh.

2.1.3 Function Documentation**2.1.3.1 read_coeffs()**

```
bool read_coeffs (
    const char * prompt,
    double coeffs[COEFF_NUM] )
```

Reading 3 coefficients from stdin.

Parameters

in	<i>prompt</i>	message to user
out	<i>coeffs</i>	array for coeffs, length must be ≥ 3

Returns

true if all OK
false on error

Definition at line 13 of file SqEq.cc.

References COEFF_NUM.

2.1.3.2 print_res()

```
void print_res (
    int res_type,
    const double results[MAX_ROOT_NUM] )
```

Print squaree equations roots.

Parameters

in	<i>res_type</i>	defines error/number of roots
in	<i>results</i>	roots

Definition at line 92 of file SqEq.cc.

References RT_ERROR, RT_INF_ROOTS, RT_INV_COEFF_ERROR, RT_NO_ROOTS, RT_NULLPTR_ERROR, RT_ONE_ROOT, and RT_TWO_ROOTS.

2.1.3.3 solve_sqeq()

```
int solve_sqeq (
    const double coeffs[COEFF_NUM],
    double results[MAX_ROOT_NUM] )
```

Solving square equation.

Parameters

in	<i>coeffs</i>	array with coefficients, length must must be ≥ 3
out	<i>results</i>	array with roots, length must must be ≥ 2

Returns

result type

Definition at line 20 of file SqEq.cc.

References is_equal(), RT_ERROR, RT_INV_COEFF_ERROR, RT_NO_ROOTS, RT_NULLPTR_ERROR, RT_ONE_ROOT, RT_TWO_ROOTS, and solve_linear().

2.1.3.4 solve_linear()

```
int solve_linear (
    double b,
    double c,
    double * x_ptr )
```

Solving linear equation.

Parameters

in	<i>b</i>	coeff on x
in	<i>c</i>	free member
out	<i>x_ptr</i>	result pointer

Returns

result type

Definition at line 71 of file SqEq.cc.

References `is_equal()`, `RT_INF_ROOTS`, `RT_NO_ROOTS`, and `RT_ONE_ROOT`.

Referenced by `solve_sqeq()`.

2.1.3.5 is_equal()

```
int is_equal (
    double n1,
    double n2 )
```

Compares two double numbers.

Parameters

in	<i>n1</i>	1st num
in	<i>n2</i>	2nd num

Returns

int

Definition at line 87 of file SqEq.cc.

References `EPS`.

Referenced by `solve_linear()`, and `solve_sqeq()`.

2.1.3.6 ret_code()

```
int ret_code (
    int res_type )
```

Generate program return code.

Parameters

in	<i>res_type</i>	value returned by solve function
----	-----------------	----------------------------------

Returns

int

Definition at line 124 of file SqEq.cc.

References RT_VALID, and SSEQ_ERROR.

2.1.3.7 unit_testing()

```
bool unit_testing ( )
```

Testing SqEq functions.

Returns

true if all tests passed
false if tests not passed

2.2 /home/tako/programming/HWW/0_SqEq/lib/SqEq.cc File Reference

File with most important SqEq functions.

```
#include <assert.h>
#include <math.h>
#include <stdio.h>
#include "SqEq.hh"
```

Functions

- bool [read_coeffs](#) (const char *prompt, double coeffs[COEFF_NUM])
Reading 3 coefficients from stdin.
- int [solve_sseq](#) (const double coeffs[COEFF_NUM], double results[MAX_ROOT_NUM])
Solving square equation.
- int [solve_linear](#) (double b, double c, double *x_ptr)
Solving linear equation.
- int [is_equal](#) (double n1, double n2)
Compares two double numbers.
- void [print_res](#) (int res_type, const double results[MAX_ROOT_NUM])
Print squaree equations roots.
- int [ret_code](#) (int res_type)
Generate program return code.

2.2.1 Detailed Description

File with most important SqEq functions.

Author

Tako

2.2.2 Function Documentation

2.2.2.1 read_coeffs()

```
bool read_coeffs (
    const char * prompt,
    double coeffs[COEFF_NUM] )
```

Reading 3 coefficients from stdin.

Parameters

in	<i>prompt</i>	message to user
out	<i>coeffs</i>	array for coeffs, length must be ≥ 3

Returns

true if all OK
false on error

Definition at line 13 of file SqEq.cc.

References COEFF_NUM.

2.2.2.2 solve_sqeq()

```
int solve_sqeq (
    const double coeffs[COEFF_NUM],
    double results[MAX_ROOT_NUM] )
```

Solving square equation.

Parameters

in	<i>coeffs</i>	array with coefficients, length must be ≥ 3
out	<i>results</i>	array with roots, length must be ≥ 2

Returns

result type

Definition at line 20 of file SqEq.cc.

References `is_equal()`, `RT_ERROR`, `RT_INV_COEFF_ERROR`, `RT_NO_ROOTS`, `RT_NULLPTR_ERROR`, `RT_ONE_ROOT`, `RT_TWO_ROOTS`, and `solve_linear()`.

2.2.2.3 solve_linear()

```
int solve_linear (
    double b,
    double c,
    double * x_ptr )
```

Solving linear equation.

Parameters

in	<i>b</i>	coeff on x
in	<i>c</i>	free member
out	<i>x_ptr</i>	result pointer

Returns

result type

Definition at line 71 of file SqEq.cc.

References `is_equal()`, `RT_INF_ROOTS`, `RT_NO_ROOTS`, and `RT_ONE_ROOT`.

Referenced by `solve_sqeq()`.

2.2.2.4 is_equal()

```
int is_equal (
    double n1,
    double n2 )
```

Compares two double numbers.

Parameters

in	<i>n1</i>	1st num
in	<i>n2</i>	2nd num

Returns

int

Definition at line 87 of file SqEq.cc.

References EPS.

Referenced by solve_linear(), and solve_sqeq().

2.2.2.5 print_res()

```
void print_res (
    int res_type,
    const double results[MAX_ROOT_NUM] )
```

Print squaree equations roots.

Parameters

in	<i>res_type</i>	defines error/number of roots
in	<i>results</i>	roots

Definition at line 92 of file SqEq.cc.

References RT_ERROR, RT_INF_ROOTS, RT_INV_COEFF_ERROR, RT_NO_ROOTS, RT_NULLPTR_ERROR, RT_ONE_ROOT, and RT_TWO_ROOTS.

2.2.2.6 ret_code()

```
int ret_code (
    int res_type )
```

Generate program return code.

Parameters

in	<i>res_type</i>	value returned by solve function
----	-----------------	----------------------------------

Returns

int

Definition at line 124 of file SqEq.cc.

References RT_VALID, and SSEQ_ERROR.

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