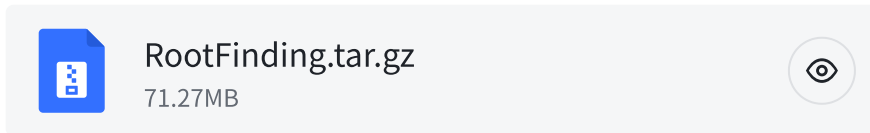


RootFinding User Guide

Executable File:



Dependencies

Only need to install MPI and boost(including boost::MPI)

Bash

```
1  #install mpich
2  wget https://www.mpich.org/static/downloads/3.3.2/mpich-3.3.2.tar.gz
3  tar -zxvf mpich-3.3.2.tar.gz
4  cd mpich-3.3.2
5  ./configure
6  make && make install
7
8  #install boost with mpi implementation
9  wget https://boostorg.jfrog.io/artifactory/main/release/1.66.0/source/boost_1_66_0.tar.bz2
10 tar -xjf boost_1_66_0.tar.bz2
11 cd boost_1_66_0
12 ./bootstrap
13
14 vi project-config.jam #modify project-config.jam
15 using mpi ; # append this line at the end of the file, Note that there is a space before the semicolon
16 ./b2 install # Compile, it takes about 20 minutes or more
```

Usage

Just open GUI/gui (a binary file), then select one input file and run. Please note the input format of the file below.

InputFile Format:

The first and the second lines contain integer N and M, which represent the number of expressions and variables.

Next N lines contains N expressions.

Next M lines contain M variables and its interval to be solved. (x -1 1 represents finding x's root in [-1,1]).

Finally, a line containing a float number indicates the precision at which the subdivision ends.

There is an example input file.

For Example:

```
Bash
1 4
2 4
3 9*x1^4*x3*x4^4-9*x2^5*x4^2+7*x2^4*x3^3-6*x2^2*x4^4-3*x1*x2*x4^3+6*x1^2+8*x2+3*x3+7*x4+4
4 -4*x1*x3^4*x4^4+3*x1^4*x3^3*x4-4*x1^2*x2^3*x3^3-5*x1*x2*x3^2*x4^2+2*x2^4*x3*x4-10*x1*x3-8*x1+3*x2+4*x3+4*x4+8
5 -6*x1^3*x2^2*x3*x4^3-x1*x2^2*x4^6+6*x1^5*x2*x4^2-8*x1^2*x2^3*x4^3-6*x1*x3^3*x4^4+6*x1^2*x4-x1-9*x2-3*x3+9*x4+4
6 x1^2*x2^5*x4^2-2*x1^5*x2^3-x1^3*x2^4+4*x2^6*x4+2*x1^5*x4+8*x1*x2*x3^4+9*x2-3*x3-2*x4+6
7 x1 -1 1
8 x2 -1 1
9 x3 -1 1
10 x4 -1 1
11 1e-6
```

OutputFile Format:

Including R and SR, representing the interval including root and the interval that cannot be judged(there may contain roots or not).

If select Using Newton's Method to Exclude Suspected Intervals, root.size represents how many roots we can get through above.

For example:

