Numerical analysis – methods

User's manual

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Summary of the page

The Methods Analysis application is a project which allows the user to use various numerical methods for root search. At the moment, the project does not have a login or registration system, so it is freely accessible to everyone. When accessing, the user will find the home page

Once there, you can access the "about" page, which is a summary with the purpose of the project, or alternatively, one of the 15 numerical methods available.

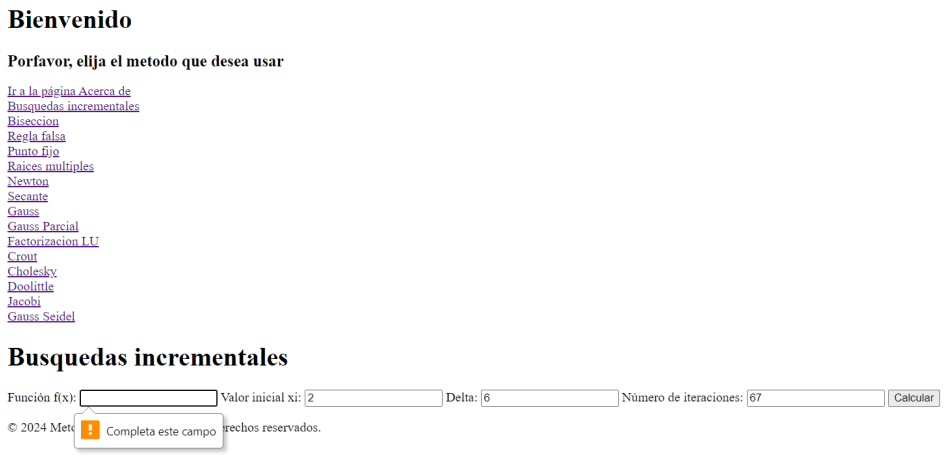
Available methods

There are currently 15 methods available, as follows:

- Incremental Searches
- Bisection
- False rule
- Fixed Point
- Newton's method
- Multiple roots
- Secant method
- Simple Gaussian elimination
- Gaussian elimination with partial pivoting
- LU factorization
- Crout
- Doolittle
- Cholesky
- Jacobi
- Gauss-Seidel

The first 7 of these methods are methods for solving single variable problems, while the remaining 7 are used to solve systems of linear equations.

Each method requires a series of inputs necessary for its correct operation, in case one of these inputs is not entered, an alert message like the following will be displayed:



The following is a short guide to the inputs required for each method. Note that some methods, such as Crout's, Doolittle's and Cholesky's require similar inputs, so they will only be mentioned once in the guide.

Input Guide

Initial clarifications

Fields related to functions must be copied in a way that is compatible with the Python math library, additionally, matrices are written separating columns with spaces and rows with "," e.g.: [3 4 5, 2 6 7. 9 0 4].

Incremental Searches

. Function f(x): The function of which you want to find the root.

. xi: The initial value of x

. Delta: The difference between the values that x is going to take

. Number of iterations: Maximum number of iterations to find the root.

Bisection

. Function f(x)

. Initial value xi: Value to be taken by the lower limit of x

. Initial value xs: Value to be taken by the upper limit of x

. Tolerance: The error tolerance, which will indicate when it will be correct to stop the method.

. Number of iterations

False Rule

. Function f(x)

. Initial value xi

. Initial value xs

. Tolerance

. Number of iterations

Fixed Point

. Function f(x)

. Function g(x): Clearing performed for the function f(x).

. Initial value x0: Initial value of x

. Tolerance

. Number of iterations

Multiple roots

. Function f(x)

. Derivative of f(x): First derivative of the function f(x).

. Second derivative of f(x): Second derivative of the function f(x).

. Initial value x0

. Tolerance

. Number of iterations

Newton

. function f(x)

. Derivative of f(x)

. Initial value x0

. Tolerance

. Number of iterations

Drying agent

. Function f(x)

. Initial value of x0: Value of the first x

. Initial value of x1: Value of the second 2

. Tolerance

. Number of iterations

Gauss

. Size of the square matrix: the size of the matrix is written because only square matrices can be worked with, the number of columns and rows is written in a single number.

. Matrix of coefficients A: Matrix a of coefficients

. Independent terms b: Matrix of independent terms

Partial Gaussian

. Size of the square matrix

. Matrix of coefficients A

. Independent terms b

LU factorization

. Size of the square matrix

. Matrix of coefficients A

. Independent terms b

Crout

. Size of the square matrix

. Matrix of coefficients A

. Independent terms b

Cholesky

. Size of the square matrix

. Matrix of coefficients A

. Independent terms b

Doolittle

. Size of the square matrix

. Matrix of coefficients A

. Independent terms b

Jacobi

. Size of the square matrix

. Matrix of coefficients A

. Independent terms b

. Initial value: The initial value to be taken by x

. Type of error: Type of error to compare the tolerance, you can choose between absolute error and relative error.

. Tolerance

. Number of iterations

Gauss-Seidel

. Size of the square matrix

. Matrix of coefficients A

. Independent terms b

. Initial value: The initial value to be taken by x

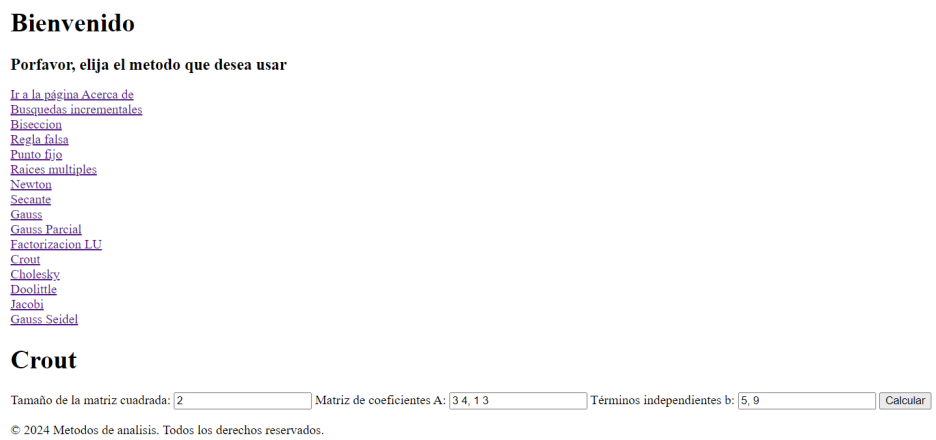
. Type of error: Type of error to compare the tolerance, you can choose between absolute error and relative error.

. Tolerance

. Number of iterations

Operation

Once the user enters the required inputs in the fields, he/she should click on the calculate button, and the page will return in a small message the result of the numerical method, whether it converges, does not converge, or has encountered an unexpected error.



Bienvenido

Porfavor, elija el metodo que desea usar

Ir a la página Acerca de
Busquedas incrementales
Biseccion
Regla falsa
Punto fijo
Raices multiples
Newton
Secante
Gauss
Gauss Parcial
Factorizacion LU
Crout
Cholesky
Doolittle
Jacobi
Gauss Seidel

Crout

Tamaño de la matriz cuadrada: Matriz de coeficientes A: Términos independientes b: Calcular

El resultado es: El resultado es [-4.2 4.4]