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Math128A: Numerical Analysis

Programming Assignment, Due Nov. 13, 2019

Implement the *modified zeroin* algorithm in *A modified Brents method for finding zeros of functions*, by G. Wilkins and M. Gu, in **Numerische Mathematik**, vol. 123, 2013.

You should turn in a .m file `modifiedbrentxxx.m` which contains a matlab function of the form

```
function
[root,info] = modifiedbrentxxx(@func,Int,params)
```

where xxx is your student id. On input, `func` is a function handle, `Int` is the initial interval, [`Int`.a, `Int`.b], containing a root, and `params` is an object that contains at least three fields `params.root_tol`, `params.func_tol` and `params.maxit`. Your algorithm should terminate once the interval containing the root is at most `params.root_tol` in length, or the function value at the current iterate is at most `params.func_tol` in absolute value. On output, `root` is the computed root, and `info` should have at least one field `info.flag`, which is 0 for a successful execution, and 1 otherwise.

Your program **can not** use the matlab built-in function `fzero`. It will be tested against a few functions of our choice, against the following criteria:

1. (60 points) A zero is found within given tolerances for each function tested.
2. (40 points) One zero is found within the right number of function calls for each function tested.

Your program will receive 0 points if the string `fzero`, case in-sensitive, shows up anywhere in your .m file.

Submit your .m file to your GSI by 1:00AM, Nov. 14, 2019.