

# MECE5397 / 6397

## Assignment 2

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# Assignment 2: Numerical methods

In this assignment, you are asked to program a number of algorithms intended for unconstrained optimization.

In class, we have discussed 5 different optimization algorithms as well as one method for line search. In this assignment, there are four parts,

Part 1: implement golden ratio line search

Part 2: implement steepest descent

Part 3: implement conjugate gradient

Part 4: implement modified newton method



# Administrative details

For this assignment, you can work in groups of two.

This assignment is given one week earlier than planned, but the due date remains the same. (March 9<sup>th</sup>, 5:30pm)



# Grading

Points	Criteria
7.5 Points	Error free code that runs on Google Colab. The code must be well documented, with comments on each significant line (i.e. any lines that are more complex than $a = 0$ ).
7.5 Points	You are given 4 different test cases to run. They must all run correctly for different starting points. These may not be the ones you are given. Note that these are all convex. You must not change the code of these test cases at all.
5 Points	The algorithms run correctly for other problems with two optimization variables.
2.5 Points	The algorithms run correctly for problems with more than two optimization variables.
2.5 Points	The algorithms can compute numerical derivatives and hessians, <i>i.e.</i> they do not necessarily need analytical derivative and hessian functions
Total: 25 points	There are 5 bonus points

