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AME 565

Homework 4 Report

In order to prove the efficacy of the program, I used the example from class. My objective function was:

```
% arbitrary function
fun = @(x) -2*x(1) - x(2);
```

And two nonlinear constraints:

```
g1 = @(x) x(1)^2 + x(2)^2 - 25;
g2 = @(x) x(1)^2 - x(2)^2 - 7;
```

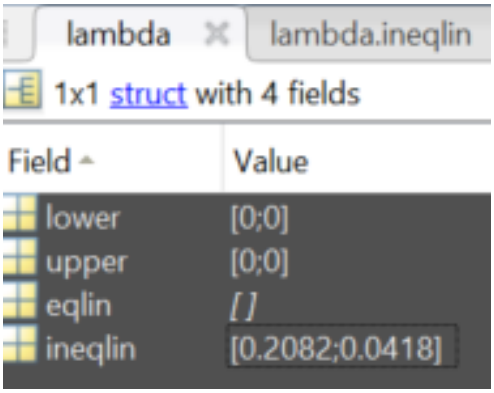
The program works for a nonlinear objective function and additional design variables as well. It runs until either soft or hard convergence is found within a defined error.

For this case, it took 5 iterations to reach the solution, where it found soft convergence. The program will tell you whether you reach hard or soft convergence via a prompt in the command window.

In this case, the lower/upper bounds were not active, but the two inequality constraints are active when it converged on a solution, given by the nonzero values:

Lambda1 = 0.2082

Lambda2 = 0.0418



Below is a list of the constraints, which should both be positive or (in this case) near zero and positive to violate the constraints (on the 5th iteration).

Iteration	1	2	3	4	5
g1	-17	-7	1.0278	0.026335	1.92E-05
g2	-7	-7	-1.0278	-0.02634	-1.92E-05

It can also be seen how the function value evolves per iteration in the following plot.