PHYS358: Session 11

Optimization (I): Golden Section

This is just a short demonstrator of the Golden Section mimimum search (see e.g. Numerical Recipes). The main code you'll find in `golden.py`. It takes an argument specifying the optimization problem. `parabola1d` finds the minimum of a parabola centered on $x = 1$. `lunarlander` finds the optimal time when the throttle of the lunar landing module should be switched from off to full blast.

1. Develop a flow-chart to figure out what functions are being called and what their task is. Spend some time on `cost.py` – this is an example of a python class (i.e. for object-oriented programming). It's beyond what we can discuss in class, but you might find this useful at some point.

2. Determine the correct minimum for the parabola and test the code.

3. Run the lunar landing problem and determine the optimal time.

4. Find where the cost function is calculated.

5. What does the code optimize on?

6. Modify the cost function such that it only optimizes on fuel consumption and run the problem again. What did you expect?