Problem 1

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PART A

0 points possible (ungraded)

Consider the following nonlinear constrained minimization problem:

$$\left.\begin{aligned} \min \quad & \sqrt{x_2} \\ \text{s.t.:} \quad & \\ & x_2 \geq \left(\tfrac{5}{2}x_1\right)^3 \\ & x_2 \geq \left(-\tfrac{3}{2}x_1 + 1\right)^3 \\ & x_2 \geq 0 \end{aligned}\right\}$$

A plot can be found below

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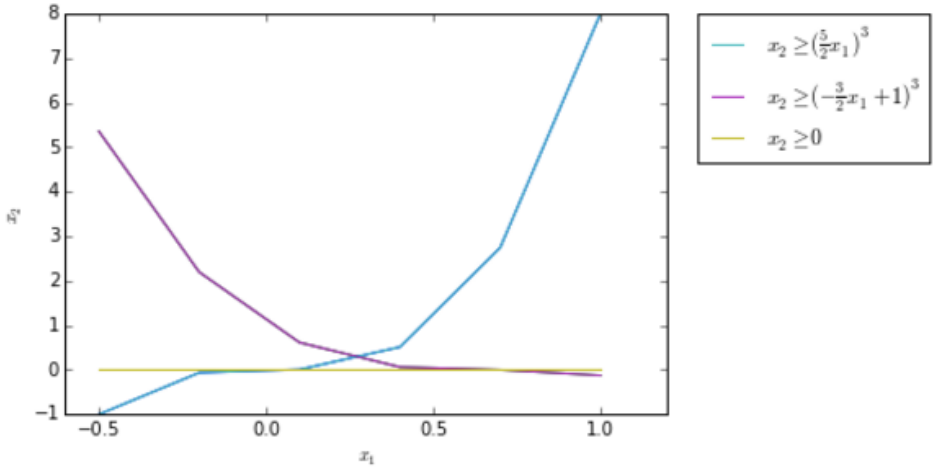

Hint: Several algorithms will work, but we suggest the method of moving asymptotes, the details of which are not necessary to understand for the time being.

To two decimals, what is the objective value?

You can solve using spreadsheet optimization or using Julia. If you use Julia, you will need the following additional syntax

```
Pkg.add("NLopt")
yourModelVariable=Model(solver=NLoptSolver(algorithm=:LD_MMA))
@NLobjective(yourModelVariable, Max/Min, Function)
@NLconstraint(yourModelVariable, Inequality))
setvalue(variable, initialValue)
```

0.49 ✔ **Answer:** 0.49

0.49

Solution

See R6_P1_sol.ipynb for the Julia solution

See R6P1_sol.xlsx for the Excel solution

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