MATH 4420/6420 HW 6 due April 18, 2022

(Unconstrained & inequality constrained NLPs)

(100 points; Show all work to get full credit.)

Guidance for writing your assignment:
a) make sure that your writing is legible and clear
b) wherever appropriate, underline or rewrite the final answer
c) clearly separate your work for subsequent questions
d) submit your work on Canvas as one pdf file saved as <LastName_H#.pdf>, for example, <Smith_H1.pdf>

In every problem below, give theoretical arguments in support of the optimality of the solutions you found.

1. Problem 9.6 page 335.
(a) (5 points)
(b) (5 points)

2. Problem 9.7 page 335.
(a) (5 points)
(b) (5 points)

3. Problem 9.8 page 336.
(a) (5 points)
(b) (10 points)

4. Consider the NLP given in Problem 9.28 page 339.
(a) (5 points) Write the KKT FONC to this NLP.
(b) (10 points) Find all solutions (**x**, u) to the KKT FONC for this NLP.
(c) (10 points) Find all optimal solutions to this NLP. Give their properties (choose from local, global, strict local, unique global).

5. Consider the NLP given in Problem 9.32 page 340.
(a) (5 points) Write the KKT FONC to this NLP.
(b) (10 points) Find all solutions (**x**, u) to the KKT FONC for this NLP.
(c) (10 points) Find all optimal solutions to this NLP. Give their properties (choose from local, global, strict local, unique global).

6. Problem 9.38 page 341.
(a) (5 points)
(b) (5 points)
(c) (5 points)