ECE 5400 HW 2 (20 points)

Submission Instruction: submit a PDF showing the process/results

Due date: Due by 3pm February 9, 2022

1 Cost Function

No.	Model	Luxury?	Year	MPG	Horsepower	Price
1	Acura MDX	Yes	2017	20	290	$50,000
2	Honda Accord	No	2017	25	190	$25,000
3	Honda Civic	No	2012	23	160	$10,000
4	Honda Civic	No	2016	24	170	$18,000
5	Nissan Altima	No	2016	30	180	$25,000
6	Acura MDX	Yes	2015	18	280	$38,000
7	Lexus RX350	Yes	2015	21	270	$40,000
8	Toyota Prius	No	2014	45	120	$28,000
9	Toyota Prius	No	2013	40	120	$24,000

Figure 1: Car Pricing.

Suppose I have two linear models configured by two different people based on this training dataset of 9 cars,

- Model 1: $h_\theta(x) = 1000 * x_1 + 5 * x_2 + 100 * x_3 + 150 * x_4 - 15000$

- Model 2: $h_\theta(x) = 900 * x_1 + 10 * x_2 + 80 * x_3 + 120 * x_4 - 10000$

where x_1 luxury value (0 if non-luxury, 1 if luxury, e.g., for the first car, $x_1 = 1$), x_2 is year, x_3 is MPG, and x_4 is Horsepower.

(1) Can you calculate the value of the cost function for each of these two models? (2) Based on the cost function result, can you indicate which model fits the training data better? (3) Can you find a better model than these two? If yes, please write down the new $h_\theta(x)$, and show its cost function value. (You may need some trail-and-error process here just to try different combination of parameters).