

SchoolNova Computer Science 202
Homework 16 (due 2/6/2021)

Task 1

Start with the classwork code. Make sure that it runs (that is, you can successfully load table1.csv and run the code without any errors).

To remind you: The goal of international climate negotiations is to find the demand values for all countries (res.x) such that for each country the demand value is as close as possible to the “fair” demand value as defined in data[:, 7]. Moreover, the sum of all demands * 2030 projected emissions (np.sum(res.x * data[:, 2])) should not exceed the global 2030 CO2 target (for example, 26.0 GtCO2). Finally, each country has a disagreement value, or a lowest possible demand that can be accepted (in class, as assumed that all countries have the same dv).

Task 2

(a) For CO2target = 26.0, how does the demand of China and USA change if the global dv changes from 0.1 to 0.5?

(b) What if the CO2target = 46.0 (and dv remains at 0.5)

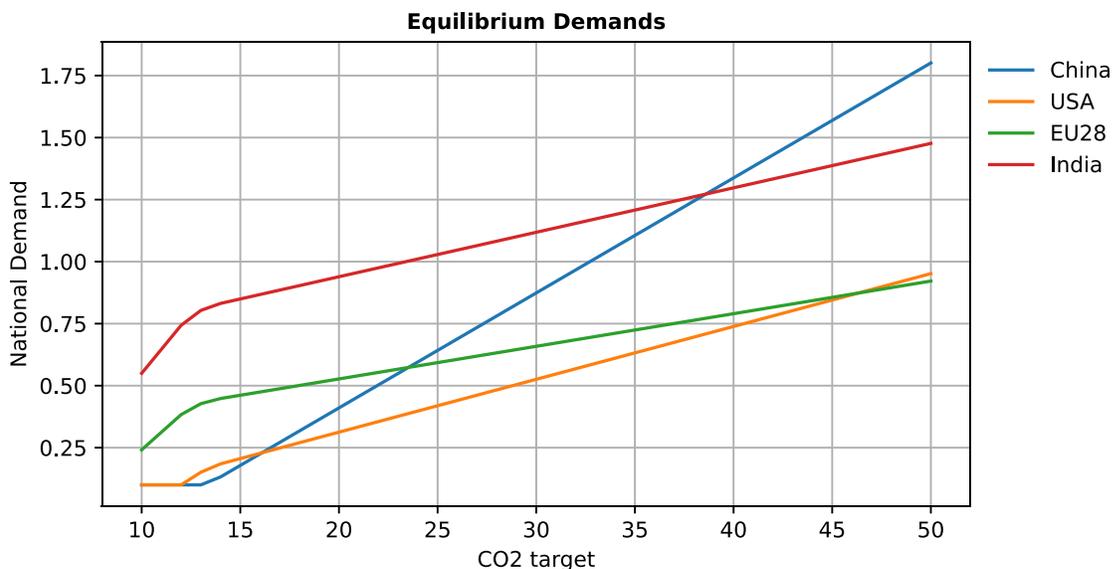
(c) What if CO2target = 26.0, all countries have dv = 0.1 and the USA has dv = 1.0 (this is analogous to the U.S. not participating in climate negotiations)? (Hint, to change dv for a single country, you need to change the constraint for that country).

Task 3

Run the minimization problem without any constraints and compare the result (res.x) with the fair outcome (data[:, 7]).

Task 4*

Going back to dv = 0.1 for all countries, can you make a plot of China, USA, EU, and India demands, as the CO2target increases from 10 to 50? Your plot should look something like the below (do not worry about the legend; see our previous SIR plots for relevant examples):



Bonus question: Which country is most affected if the real world CO2 target of 26.0 Gt is lowered to 20.0 Gt?