A Brief Model Of

Climate Change

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Climate Change

It's a thing, turns out.
But how bad is it? For that we need to consider models.

Modeling Parameters

There are three factors:
G_C, carbon-containg greenhouse gases (this is what we effect)
T, global average temprature
G_O, basically water whose concentration is effected by heat. This will fill up to roughly 50% concentration.

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Model: CO_2

Let $h(t)$ be the non-natural addition/removal (this is what "net zero" is about) of greenhouse gases into the atmospeher by us. Let N be the natural addition of carbon-containg greenhouse gases. How do we model natural removal? We model the removal with linear approximation, with removal capacity being $G_C c$ where c is a constant. (Any constant removal is factored into N, so we replace N with Δ_N.) Note that at standard GHG level, S, with $u(t) = 0$, $G_C' = 0$ and $-cS + \Delta_N = 0$ so $c = \dfrac{\Delta_N}{S}$. So:

$$G_C' = h(t) + \Delta_N - \frac{G_C \Delta_N}{S}. \tag{1}$$

Model: T

We know that heat comes in naturally, and it leaves naturally. This term is Δ_T. However, $\gamma_C G_C + \gamma_O G_0$ amount of heat is reflected back. So,

$$T' = \Delta_T + \gamma_C G_C + \gamma_O G_O. \tag{2}$$

(Heat is in celsius!)

Model: Water

This is directly related to temprature, so it's just the capacity that's filled. That is:

$$G_O = cT + K. \tag{3}$$

Wait-This-Can-Be-Solved

It turns out *water can be just plugged in, carbon dioxide is just a 1st order linear, so temprature is just a 1st order linear!*

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Carbon Dioxide

$$G_C' = h(t) + \Delta_N - \frac{G_C \Delta_N}{S} \tag{4}$$

Temprature

$$T' = \Delta_T + \gamma_C G_C + \gamma_O(cT + K). \tag{5}$$

Desmos Graphs

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Questions

Questions?

Thanks for listening!