Following the submission of our report, government officials pushed for decreased regulation equivalent to a new k-value of -0.5. As discussed in our report, a negative k-value ultimately would result in increased temperatures if allowed to be large enough. With the use of our bifurcation diagram, we can see a significant shift in behavior from the baseline regulation. The equatorial temperature of 20°C is no longer an equilibrium temperature and now lies withing a range where it will have a tendency to increase.
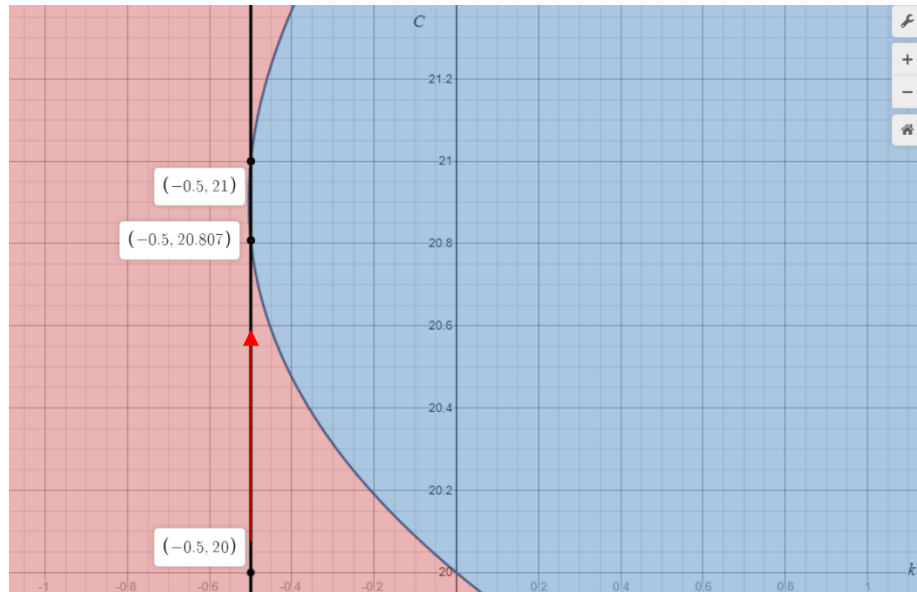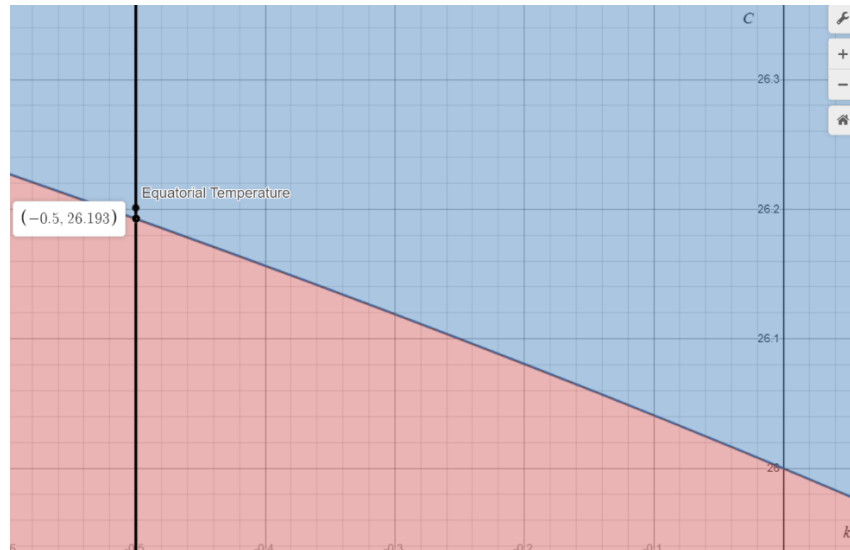

Climate v. Regulation w/ k=-0.5 (Desmos.com)

This regulation stood for a significant enough time that the temperature was able to increase to a newly created equilibrium temperature of 20.807°C. Following that increase, the Smokestack Association was able to lobby for a 5-percent change in regulation equivalent to a k-value of -0.525.
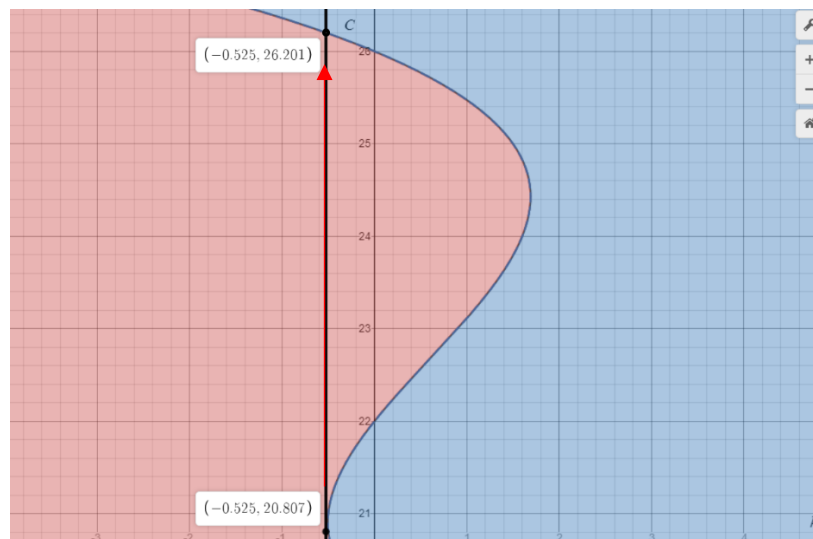
Climate v. Regulation w/ k=-0.525 (Desmos.com)

As we can see in the bifurcation graph, this decrease in regulation caused the previous equilibrium temperature that bounded our equatorial temperature to vanish. This amount of regulation leaves only one equilibrium temperature at a significant increase to 26.201˚C. Government officials allowed this regulation to sit until the equatorial temperature reached this equilibrium. They then decided to revert to a regulation of k=-0.5 in hopes that it would return the equatorial temperature to 20.807˚C.

Climate v. Regulation w/ k=-0.5 (Desmos.com)

Instead of the equatorial temperature returning to 20.807˚C, it decreased only slightly to 26.193˚C. Although the lower equilibrium temperatures around 21˚C are now returned, the previous change in regulation held long enough that the equatorial temperature is now bound to the highest equilibrium temperature. In a second attempt to lower the equatorial temperature, government officials decided to return regulation back to the baseline.

Climate v. Regulation w/ k=0 (Desmos.com)

This decrease in regulation was not significant enough to unbind the equatorial temperature from the highest equilibrium and only allowed for a decrease in temperature from 26.193˚C to 26˚C.