Why Feedback is Fubar

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Abstract:

The climate sensitivity required to support enough climate change caused by CO2 emissions to justify any remediation efforts has a theoretical dependence on positive feedback amplifying a small initial effect into a much larger steady state effect. The application of feedback to the climate is based on a serious misunderstanding of the linear feedback amplifier analysis referenced as the supporting theoretical foundation. The relevant feedback analysis will be explained followed by an account of the errors that led to its misapplication accompanied with snippets of the papers showing exactly where the specific errors occurred. It will become obvious that the hypothesis suggesting the climate sensitivity is significantly amplified by positive feedback has absolutely no correspondence to the analysis used to support it and is readily falsifiable. How this misapplication of feedback analysis became 'settled' science will also be explained.

Feedback Theory

Feedback is the most misunderstood concept in all of climate science, yet it comprises the only theoretical justification for the exceptionally large climate sensitivity that demonizes GHG emissions. To properly understand climate feedback, it's important to understand the analysis used to support its application to the climate system.

The primary reference cited in all climate feedback papers is Henrick Bode's book on linear feedback amplifier design whose first 2 paragraphs are copied below. The language is dated and esoteric, but it's meaning is precise to those who understand electronic circuits and he assumes that anyone using his analysis does. The asterisk in the introduction refers to contemporaneous references that can supply the necessary background knowledge.

> 1.1 *Introduction*
>
> The networks to be considered consist of ordinary lumped inductances, resistances, and capacities, together with vacuum tubes. The accessible terminals of the vacuum tubes will be taken as the grid, plate, and cathode. Auxiliary electrodes, such as a suppressor or screen grid, are thus ignored, and the analysis assumes, in effect, that they are grounded to the cathode at signal frequencies. For purposes of discussion the tubes will be replaced by equivalent structures consisting of ordinary circuit elements connected between the accessible terminals, together with a source of current or voltage to represent the amplification of the tube. This ignores such effects as transit time and distributed inductance in the wires inside the tube envelope, which may appear in physical tubes at sufficiently high frequencies.
>
> It will be assumed throughout that all the elements are linear. This chapter is intended principally as a recapitulation of the conventional theory for networks including vacuum tubes in a form which can be used as a foundation for the chapters to follow.*

The preconditions for applying his analysis are underlined. First, is that the system requires an implicit power source representing the amplification. For an ordinary amplifier, this is an electrical outlet or battery and by convention, power connections are omitted from the active devices in the block diagrams.

Second is that all of its elements are linear implying that the input and output are linearly related to each other across all possible values and that **there can be no difference between the incremental gain and the absolute gain**. For ordinary amplifiers, the input and output are voltages and their constant ratio is the closed loop, or system, gain. If this ratio starts to vary, the amplifier is no longer linear and Bode's analysis no longer applies. For example, when an audio amplifier is overloaded and starts to distort.

To apply feedback analysis **the input and output must be expressed in linearly related units;** moreover, even an amplifier with voltage in and current out requires the output current to be passed through a resistor to produce an output voltage that's linear to the output current, a fraction of which can be added to the input voltage as the feedback voltage.

Here's Bode's definition of a feedback network. The input is an explicit time varying signal, P1 is an implicit summation node and P2 is a simple connection.

3.2. *Elementary Theory of Feedback Circuits*

In its simplest form, a feedback amplifier can be regarded as a combination of an ordinary amplifier, or μ circuit, and a passive network, or β circuit, by means of which a portion of the output of the μ circuit can be

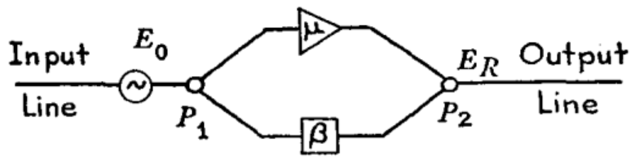
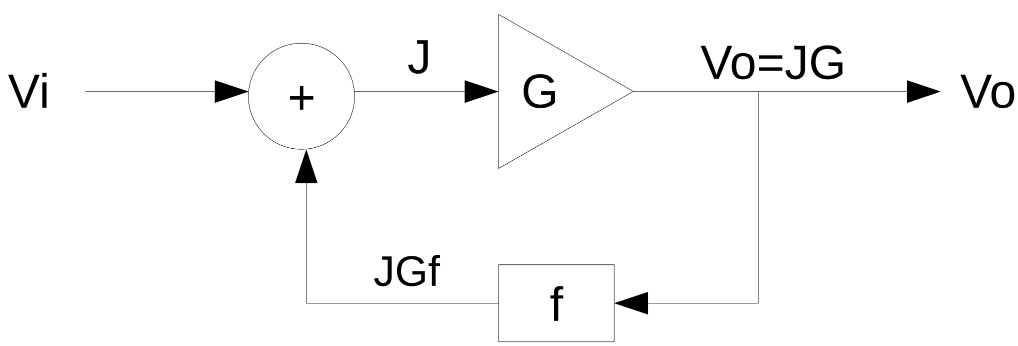


Fig. 3.1

returned to its input. Such a combination is shown by Fig. 3.1. Both the μ and β circuits are, of course, actually four-terminal structures. The circuits are represented by single lines in Fig. 3.1 for simplicity.

The diagram below is the modern representation of a feedback amplifier and is typical of climate related feedback diagrams. It has an input, **Vi** (**E_0**), an output, **Vo** (**E_R**), an open loop gain, **G** (**μ**), a feedback fraction, **f** (**β**), and a closed loop gain **g** = **Vo**/**Vi** (**E_R**/**E_0**). Each of **G**, **f** and **g** must be dimensionless ratios. Bode specifically mentions that both the active **μ** (**G**) and passive **β** (**f**) circuits are completely characterized by the dimensionless ratio of their output voltage to their input voltage. The feedback fraction, **f**, or Bode's **β** circuit, is typically a voltage divider that produces the fraction of output that is then added back to the input. The passive nature of a voltage divider limits feedback to 100% of the output and whether it's positive or negative feedback depends on the phase of the output relative to the input. What negative feedback means is that when the input voltage is rising, the feedback voltage is falling and visa versa, so the negative of a sine wave, is another sine wave that's 180 degrees out of phase. Ordinary single stage amplifiers, whether built from a tube or a transistor, are inverting amplifiers, where a sine wave input produces a sine wave output of the opposite phase providing negative feedback when a fraction of it's output is added back to the input.



Bode defines another attribute called the **feedback factor**, which is the open loop gain times the feedback fraction, **μ*****β** (**G*f)**. This metric **is not particularly important** to amplifier design except as a demonstration for how feedback reduces the open loop gain.

On page 32, Bode defines the systems constraining equation as 3-4 where the system gain, or closed loop gain, becomes **E_r/E_0** as he also qualifies the feedback factor with a theorem.

$$E_R = \mu E_0 + \mu\beta E_R, \qquad (3\text{–}3)$$

or in other words

$$E_R = \frac{\mu}{1 - \mu\beta} E_0. \qquad (3\text{–}4)$$

Without the β circuit, the output voltage would be given by $E_R = \mu E_0$. We therefore have the

Theorem: Feedback reduces the gain of an amplifier by the factor $1 - \mu\beta$.*

The quantity $\mu\beta$ can be called the *feedback factor*.† It evidently repre-

The system gain equation can also be derived from the modern representation of a feedback amplifier by noticing that **J** = **Vi** + **Vo*****f** and that **Vo** = **J*****G**. Substitute and the result is,

Vo = (Vi + Vo*f)*G

Divide both sides by **Vi** and it becomes,

Vo/Vi = (1 + Vo/Vi*f)*G

Substitute **g** for **Vo/Vi** and we get,

g = (1 + g*f)*G

Now, solve for the closed loop gain, **g**.

g = G/(1 – f*G)

1/g = 1/G – f

Bode’s gain equation 3-4 can be rearranged to arrive at the same result in terms of **μ** and **β**.

When **g** goes negative, the amplifier becomes an oscillator. When **G=1**, the system is unconditionally stable for all values of **f < 1** (anything less than 100% positive feedback). If **G** is infinite, then any positive value of **f** is unstable. For most ordinary amplifiers, **G** is large enough that the closed loop gain equation becomes,

g = -1/f

Feedback is applied to amplifiers so that the system gain is largely independent of the open loop gain. The open loop gain varies over a 2:1 range or more owing to the highly variable properties of active devices like vacuum tubes or transistors and without feedback, any design is much less predictable. Bode states this in a somewhat esoteric manner where as the open loop gain approaches infinity, the system gain is approximately proportional to the **β** circuit loss. He then arrives at this approximation of the system gain equation, $\mathbf{E_R/E_0 = -1/\beta}$.

The Climate Feedback Model

Feedback came to prominence in climate science in 1984 when James Hansen applied Bode to the climate in this snippet of his paper.

> We use procedures and terminology of feedback studies in electronics (Bode, 1945) to help analyze the contributions of different feedback processes. We define the system gain as the ratio of the net feedback portion of the temperature change to the total temperature change
>
> $$g = \frac{\Delta T_{feedbacks}}{\Delta T_{eq}} \quad . \qquad (5)$$
>
> Since
>
> $$\Delta T_{eq} = \Delta T_o + \Delta T_{feedbacks}, \qquad (6)$$
>
> it follows that the relation between the feedback factor and gain is
>
> $$f = \frac{1}{1 - g} \quad . \qquad (7)$$

To use the procedures and terminology of Bode, they must be applied properly. Bode defines the system gain as the ratio of the output to the input which has no resemblance to equation (5). The idea that temperature feedbacks arising from W/m^2 of forcing are primarily quantified by a ΔT is not even physical, since only W/m^2 of feedback can be added to W/m^2 of forcing. Bode adds the feedback to the forcing prior to amplification in order to calculate a new output which is specifically not the sum of a pre-feedback output plus a feedback contribution per equation (6) unless the open loop gain is a dimensionless 1; moreover, Hansen never disclosed, or more likely didn't know, that **he implicitly assumed unit open loop gain**. He didn't show the work for how equation (7) was derived **and flipped the gain and feedback**

terms. To fix this last error, Michael Schlesinger wrote paper which was **quickly published as an inadequately reviewed appendix** in a DOE journal (DOE/ER-0237) where he incorrectly derived a somewhat more correct gain equation as,

$\mathbf{R_f = 1/(1 - f)}$

He had **g** ($\mathbf{R_f}$) and **f** properly represented, but missed the assumption of unit open loop gain. He arrived at his conclusion by confusing the feedback factor with the feedback fraction and declared that the feedback factor was the dimensionless constant quantifying the sign and amount of feedback, which is only the case when the open loop gain is 1.

Here's Schlesinger's misunderstanding of feedback from an image of his paper which is word for word the same as the appendix in DOE/ER-0237 that was published 1 year after Hansen's 1984 paper and a few years before Schlesinger's paper appeared in an 1988 publication he edited himself. The lack of review is evident from DOE/ER-0237 and Schlesinger's paper which have the same typo referring to page 32 of Bode 1975 instead of Bode 1945.

The effect of the feedback can be characterized on the basis of the ratio of the ΔT_* with feedback to that without feedback. Thus, by Eqs. (11) and (12), we define the feedback gain ratio

$$R_f \equiv \frac{\Delta T_*}{(\Delta T_*)_o} = \frac{G_f}{G_o} = \frac{1}{1 - f} , \qquad (16)$$

where

$$f = G_o F \qquad (17)$$

1945

is the feedback factor (Bode, 1975, p. 32) or, here, simply the feedback.[1] For $f = 0$, $R_f = 1$; hence $(\Delta T_*)_o$ represents the zero-feedback temperature change. Since $0 < R_f < 1$ for $f < 0$, the latter represents negative feedback (see Fig. 2). As negative feedback increases indefinitely, $R_f \to 0$ and $\Delta T_* \to 0$; however, it is important to note that ΔT_* does not change sign as $f \to -\infty$. Since $R_f > 1$ for $0 < f < 1$, the latter represents positive feedback. As positive feedback approaches unity, $R_f \to \infty$ and $\Delta T_* \to \infty$. If the positive feedback could be extended beyond unity, R_f would change sign and approach zero from negative values as $f \to \infty$. Clearly, the region $f > 1$ is physically meaningless.[2] However, as we shall see, one SEBM has estimated de facto such strong positive feedbacks that $f > 1$ and a temperature decrease $\Delta T_* < 0$ was obtained for heating $\Delta Q > 0$!

[1] Hansen et al. (1984) call f (their g) the system gain and R_f (their f) the net feedback factor.

The feedback gain ratio, which he defines as the ratio between the closed loop gain and the open loop gain, is a meaningless distraction, since in general, the closed loop gain is largely independent of the open loop gain which is often so large, the feedback gain ratio becomes 0.

However, since the climate feedback model implicitly assumes unit open loop gain, the feedback gain ratio does become equal to the system's closed loop gain.

Schlesinger calls **f** the feedback factor which is equal to his feedback fraction, **F**, times the open loop gain, $\mathbf{G_0}$. The error is that the **f** in his gain equation should be either $\mathbf{f/G_0}$ or **F**. He incorrectly defines **f** from 0 to 1 as the dimensionless fraction representing positive feedback and claims that **f** > 1 (more than 100% positive feedback) is meaningless. The real meaning of **f** > 1 is that the combination of the open loop gain and positive feedback is enough to turn an amplifier into an oscillator and for **f** greater than 1 to indicate more than 100% positive feedback, **F** and **f** must be the same which is only true when $\mathbf{G_0}$ is 1.

By swapping **f** with **F**, he incorrectly concluded that $\mathbf{G_0}$ could have arbitrary dimensions as long as **F** canceled them out, while per Bode, both must be dimensionless. This error framed the quantification of the various feedback coefficients, making all of them physically meaningless relative to anything real. The calculation of $\mathbf{R_f}$ would be more correct by acknowledging that $\mathbf{G_0}$ is 1, but is still inconsistent because it would require the output to be W/m^2 and not degrees since you can't add degrees of feedback to W/m^2 of forcing.

Schlesinger explicitly states that $\mathbf{G_0}$ converts $\mathbf{W/m^2}$ into degrees as he implicitly assumes $\mathbf{G_0=1}$ in order to justify his dimensional $\mathbf{G_0}$! Bode's analysis is clearly not applicable since $\mathbf{G_0}$ can't be a dimensionless 1 and an arbitrary value that converts W/m^2 into degrees at the same time. In principle, Schlesinger's open loop gain, $\mathbf{G_0}$, is the incremental application of the Stefan-Boltzmann Law on the output of a unit gain amplifier where he attempted to apply feedback in order to override this immutable law of physics.

The feedback factor error takes $\mathbf{G_0}$ out of the feedback loop and incorrectly justifies applying a linear analysis to a non linear relationship. This is one of the primordial failures that led to the current body of broken climate science. In this case, Schlesinger wrote a correction to a Hansen paper whose inadequately reviewed and **demonstrably wrong analysis was positioned as properly reviewed and settled** theoretical support for an effect from CO2 that was large enough to justify the formation of the IPCC and its preconceived conclusions.

The cause of this error and its subsequent declaration as 'settled' was that **nobody** familiar with Bode's analysis had **critically reviewed Schlesinger's work** and as a result, **confirmation bias prevailed**. The peer review of his work in DOE/ER-0237 and referenced in AR1 to correct Hansen's error was limited to editing by Mike MacCracken and Fred Luther who didn't even correct the 1975/1945 typo, although they did clean up his figures. MacCracken has been associated with the IPCC since its beginning and is now chief scientist at the Climate Institute, which is a 401(3)(c) think tank strongly connected to Democrat donors whose myopic viewpoint makes them act as the lobbying arm of the IPCC. Fred Luther was at Lawrence Livermore Labs and both men deferred to Schlesinger as the feedback expert.

Schlesinger's flawed application of feedback analysis was eventually formally published by Gerard Roe who made the same errors in his 2009 paper on climate feedback, the most obvious of which are that any feedback network with non linearly related inputs and outputs or that depends on the absolute and incremental gains being different violates the linearity precondition. In the steady state, the only required work maintains the temperature by replacing its emissions, which based on the Stefan-Boltzmann Law, is definitely not incrementally linear to temperature.

What follows is the portion of Roe's paper that replicates Schlesinger's feedback factor error, with only the variable names changed. **The reason this got through formal peer review was that it referenced and echoed the errors in Schlesinger work that was wrongly considered to have been properly peer reviewed itself**.

In this snippet, Roe specifically misidentifies the feedback factor, ***f***, as the fraction of the output returned to the input whereas per Bode, it's the **β** circuit, or Roe's $\mathbf{c_1}$ that's the actual dimensionless fraction of output fed back to the input.

the feedback, compared with the reference-system response,

$$G = \frac{\Delta T}{\Delta T_0}. \tag{6}$$

The feedback factor, f, is proportional to the fraction of the system output fed back into the input,

$$f = c_1 \lambda_0. \tag{7}$$

In the electrical-engineering literature and the control-systems literature, both c_1 and $c_1\lambda_0$ are referred to as the feedback factor (e.g., Bode 1945, Graeme 1996, Kories & Schmidt-Waller 2003). The above choice is preferred as a nondimensional measure of the feedback. However, it should be borne in mind that, in so choosing, the feedback factor becomes dependent on the reference-system sensitivity parameter.[4]

Combining Equations 5, 6, and 7, it can be shown that

$$G = \frac{\Delta T}{\Delta T_0} = \frac{1}{1-f}. \tag{8}$$

[4]Hansen et al. (1984) reverses the conventional definition of a feedback factor and a gain, but is thereafter consistent.

As Hansen and Schlesinger did in their earlier feedback papers, Roe cites Bode as the source of the feedback theory being applied.

Roe also characterized the feedback fraction and the feedback factor as the same thing, which follows from the undeclared and implicit assumption that $\boldsymbol{\lambda_0}$ is a dimensionless 1. To his credit, he recognized that Schlesinger's error is what enabled $\mathbf{c_1}$ (**f**) and $\boldsymbol{\lambda_0}$ (**G**) to have arbitrary reciprocal dimensions and attempted to explain it by stating that the feedback factor was the preferred dimensionless feedback coefficient over $\mathbf{c_1}$**.** This isn't even an option since Bode's analysis requires each of ***f***, $\mathbf{c_1}$, $\boldsymbol{\lambda_0}$ and thus $\mathbf{c_1}\boldsymbol{\lambda_0}$ to be constant, dimensionless ratios.

The application of feedback analysis is rationalized by considering that approximate linearity around the mean is sufficient to meet the linearity constraint and that the average forcing not accounted for by the incremental analysis is the power supply. **Approximate linearity around the mean isn't even close to sufficient as the system gain must be constant for all possible inputs and outputs, from 0 to their maximum limits. The average not accounted for by the incremental analysis is not available to be the power supply, since all of this power is already completely consumed maintaining the average temperature which is also not accounted for by an incremental analysis.**

Can Feedback Theory Be Applied

To address the linearity constraint, the input can be all of the solar forcing and the output can be the radiant surface emissions, both expressed in W/m^2. The radiant surface emissions are the Stefan-Boltzmann emissions of the surface at its average temperature. The complete influence of all non radiant energy flux between the atmosphere and the surface, for example, **latent heat plus its return the surface, is already accounted for by the average temperature and its radiant emissions and can therefore be considered to have a zero sum influence** on the radiant balance and the resulting radiant sensitivity. This is true even if any or all of the offset of non radiant energy leaving the surface happens to be radiant.

Best practice modeling considers modeling a change to the system, for example, a change in CO2 concentrations, as an equivalent change in solar forcing while keeping the system, that is CO2 concentrations, constant. Considering a change to the system, or a dependence of the system on its state as forcing independent of the solar forcing is physically incorrect as neither would have any effect in the absence of solar forcing.

The open loop gain is 1, which without feedback models an ideal black body. The Earth has an average temperature of about 288K producing 390 W/m^2 of radiant surface emissions arising from a total incident flux of 240 W/m^2. The result is a closed loop gain of about 390/240 = 1.62. This means that each W/m^2 of solar power results in 1.62 W/m^2 of surface emissions and that each W/m^2 of the planets emissions requires 1.62 W/m^2 to be emitted by the surface. The IPCC's nominal sensitivity of 0.8C per W/m^2 requires the next W/m^2 of solar forcing to increase the surface emissions by 4.4 W/m2 requiring the surface to emit 4.4 W/m^2 for each incremental W/m^2 that leaves the planet. This is clearly impossible, as the climate system can't tell one W/m^2 from any other, nor can feedback selectively operate on only the next W/m^2; moreover, all W/m^2, including the next one, are arriving concurrently.

The required feedback for this model is about 38% positive. Any concern that this is positive feedback is a red herring since when the open loop gain is unity, the system is unconditionally stable for all positive feedback less than 100%.

This linear model is still non conforming, as there's no implicit power supply. To compensate, we must conserve energy between the input and output of the gain block. This means that the output power comes from the input and feedback power, thus the output of the gain block can contribute to the system output or become feedback, but not both. The system output will never exceed the input since any boost by feedback will be consumed as the feedback itself!

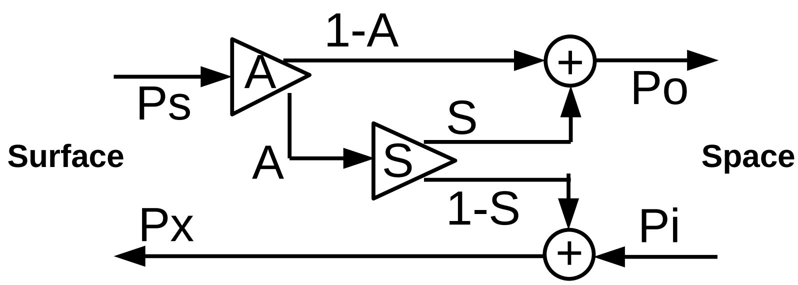
It should be clear that **without its implicit power supply, a feedback amplifier can't amplify regardless of the sign or magnitude of its feedback, since without a power supply, there's no amplified output to feed back.** Bode's analysis can't be applied to the climate because it requires active gain, while the climate is a passive system. The difference is that the output power of a passive system is dependent only on its input power, while for an active system, the output power is dependent only on the limits of its implicit power supply.

Additionally, Bode assumes zero delay in the feedback path. For the climate system, what's considered the feedback power is delayed and arrives to be combined with new forcing at a later time and is not added to the specific forcing that resulted in the feedback, as is assumed by Bode's analysis.

What System Model Does Work

Consider the following block diagram of a passive radiant model of the Earth's atmosphere. **Po** and **Pi** are the power to and from space, **Ps** is the radiant surface emissions and **Px** is the power replacing those emissions. We could add another input and output on the surface side of the model representing the non radiant energy leaving the surface and its offsetting return to the surface, but whatever effect that flux has is already accounted for by the steady state average temperature and the values of **Pi, Po, Ps** and **Px**.

The variable **A** represents the fraction of **Ps** that's absorbed by the atmosphere while **1-A** is the fraction not absorbed and sent directly to space. The variable **S** is the fraction of **A** that's delayed and ultimately contributes to **Po**, while **1-S** is the delayed fraction returned to the surface in order to offset the part of **Ps** that's greater than **Pi**. The steady state average is defined when the average of **Ps** is equal to **Px** and that of **Po** is equal to **Pi**.



The expected and measured value of **S** is about ½, with short term deviations of only a few percent on either side. This is expected because it's a first order function of geometry where the area across which the atmosphere emits what it absorbs is about twice that over which it's absorbed. Most of **Pi** that's absorbed by the atmosphere is absorbed by the water in clouds, which since the return time to the surface via the hydro cycle is much less than the averaging periods applied to the data, becomes a proxy for **Pi** contributing directly to **Px**.

The limits on **A** are between 0 and 1. For **A=0**, **Pi=Po=Ps=Px** which is the expected result for an ideal black body. For **A=1**, **Pi=Po**, **Ps=Px** and **Ps=Pi*2** which limits the maximum possible radiant surface sensitivity to 2 W/m^2 of surface emissions per W/m^2 of forcing. The presumed lower bound is more than 0.4C per W/m^2 which translates into more than 2.2 W/m^2 of surface emissions per W/m^2 of forcing and already exceeds the maximum possible surface sensitivity as limited by a passive, energy conserving, radiant model of the atmosphere. Note that the Venusian **Ps** and **Px** are relative to cloud tops and not the solid surface below since its solid surface and clouds are not thermodynamically coupled as they are on Earth.

Earth's **Ps**/**Pi** ratio is analogous to the closed loop gain, **g**, where **Po** = **Ps**/**g** and **Px** = **Pi***g**. The attenuation of **Ps** by **1/g** to produce **Po** is quantifiable as a gray body emitter whose temperature is that of the surface emitting **Ps** and whose emissivity is **1/g** producing an output of **Po**. The surface supports a warmer temperature simply because about half of what's attenuated by clouds and GHG's by the emissivity is returned to the surface to supplement future solar forcing. Trivial math derives the lone free variable in the energy balance, **g,** as a function of **A** given that **S=1/2**.

g = 1/(1 – A/2)

The implication is that for the observed **g** to be 1.62, **A** must be 0.76, meaning that 76% of the radiant energy emitted by the surface as a consequence of its temperature is absorbed by the atmosphere, half of which is returned to the surface at a later time in order to sustain more future emissions than future solar forcing can achieve on its own, while the remaining half is emitted into space to supplement what's passed directly into space offsetting the remaining past incident solar energy. Note the correspondence of this to the feedback gain equation, where given the assumption of unit open loop gain, **A/2** is the amount of positive feedback required to achieve a system gain of 1.62. Relative to Schlesinger's analysis, **f = F = A/2** and is equal to the same 38% positive feedback required by the linear feedback model.

What the climate feedback model is attempting to calculate can be derived by converting surface emissions, **Ps,** to a temperature, **Ts**, and **inverting the Stefan-Boltzmann Law.**

$$Ts = (Ps/\sigma)^{0.25}$$

To calculate the steady state sensitivity, substitute **Pi*g** for **Ps** and then differentiate **Ts** with respect to **Pi** to arrive at the steady state surface emissions sensitivity to solar forcing, where **dTs** is the incremental output of the model when **dPi** is the incremental input.

$$dTs/dPi = g/(4*\sigma*T^3)$$

Substitute 288K for **T,** 1.62 for **g** and the calculated sensitivity of the surface temperature to changes in W/m^2 of total forcing becomes **0.3K per W/m^2**. **This is the one and only relevant sensitivity metric since 1 Watt is 1 Joule per second, Joules adhere to the superposition principle and Joules are the units of work.** While the work required to change the temperature is linear to the change in temperature, the work required to maintain the temperature is proportional to the temperature raised to the fourth power which is all that matters in the steady state since the temperature has already changed.

Hansen mentions this sensitivity analysis in an appendix to his paper and calculates the same value, but incorrectly considers this calculated gain to be before feedback has been applied. This is another failure in the logic supporting the application of feedback analysis to the climate. The effective emissivity is a post feedback result since all feedback like effects have already had their full influence on all of the solar forcing that results in the steady state surface temperature, its emissions and sensitivity. The next average W/m^2 will be indistinguishable from and subject to the same seasonal variability and feedback as all of the others.

Conclusion

The application of positive feedback to the climate defies conservation laws by amplifying the climate sensitivity without bound and it's absurd that this is accepted as 'settled' science. The errors that led to this faulty conclusion must be exposed and corrected. When proper science is applied to the climate system, it becomes clear that mitigating CO2 emissions is a waste of time, money and intellectual capital that's destined to destroy modern society by causing It to waste trillions of dollars attempting to fix a climate that doesn't need to be fixed all under the guise of a fake greater good that's continually reinforced with emotional manipulation.

The only energy related danger we face is running out of oil and the only viable solution is nuclear. Intermittent sources like solar, wind and the batteries required to make them work have a place, but that place is definitely not as a base load source of power. Over committing to ‘green’ energy is a clear and present danger whose detrimental effects are already being felt and will only get worse as the Biden administration is determined to commit trillions of dollars to green virtue signaling whose only tangible effect will be the decimation of our economy in order to make climate alarmists feel better about themselves.

The biggest existential threat we face today is climate alarmism, which the political left obsessively thinks is its most supportable cause. Their justification is based on science that’s so corruptly wrong, and in so many ways, it’s an embarrassment to legitimate science. Unless climate science can be repaired, we face a dark, cold and oppressive future.

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