The Nonlinear Contention

(Protraction of Einstein's Non-Symmetric Field Theory)

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Supplements To
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"…in the theater of scientific exploration, no theory is ever concluded or proven. In the end, it can only be complete when dismissed by a more advanced theory." – *B. Erkiletian*

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Introduction

This thesis is a revision of my previous theoretical work. It has been renamed, because the basic concept came from Albert Einstein. However, regardless of whether the conclusions are right or wrong, I do take credit for the content of theory presented here.

Although the elementary theory is considerably out of the norm of today's scientific adherence, in my opinion the most substantial theoretical finding concerns the advanced mathematics shown in the latter chapters. Specifically, this is the discovery of the "Base Dependent Exponential" first shown in Chapter 8 (*The Mathematics of the Nonlinear Field – Part I*). Nevertheless, this writing only vaguely addresses the significance of it. In the future, I'm convinced that further developments of the mathematics presented here will virtually replace all known fundamental linear equations and render presently accepted linear mathematics obsolete. In fact, it seems that almost all (or perhaps all) prominent mathematician's research today is in "linear mathematics." In truth however, assuming linearity as the basis of analytical derivation misses the true nature of reality.

This writing represents some 60 years of independent study and research by me, but it must be noted that the premise of the theory was first suggested by Einstein. In essence, this work is an independent continuation of theoretical perception *as I see it*, pertaining to Albert Einstein's theory of the nonlinear (or non-symmetric) macro space continuum.

Tribute

If you are asked to name a great scientist of the 20th Century, invariably the first person that comes to mind is Albert Einstein. His last theoretical work was published in 1956, actually the year following his death. It's called *The Relativistic Theory of the Non-Symmetric Field* [5] and represents the conclusive avenue that theoretical physics <u>should</u> have taken ever since then. Although there may be some discrepancies in the theory itself, the opinion presented in the last four paragraphs lettered A through D simply titled *General Remarks* is definitely the most profound theoretical concept of cosmology ever envisioned (especially paragraphs B and C). In these brief paragraphs, Einstein stated what he believed pertaining to nonlinear field theory but hadn't been able to prove.

Unfortunately he passed away before such proof was realized. Had he lived just a few more years; the direction of theoretical cosmology today would be very different (it would actually make sense).

It's disconcerting that there has been <u>no</u> further development of nonlinear field theory. It seems absurd to me that the most prominent theoretical physicist of the last century is being virtually ignored by today's scientists. Absurd, but I think not for unwarranted reasons.

The main reason is stated by Einstein himself in the third paragraph of his *General Remarks*. Here he said that the nonlinear field theory is not being accepted because, in his opinion "nobody knows anything reliable about it." That's still true today.

For some reason, even as a child, I've always had an understanding of conservation law. Scientifically, things don't originate from nothing. Maybe they do in other areas of philosophy, but not in science.

With an understanding of the conservation laws (along with an extremely high mechanical aptitude and of course an accredited BSME), I've been a very successful mechanical design engineer. I know from experience, that developing a working understanding of advanced mathematics and physics is essential for a practicing engineer, regardless of the extent of natural ability.

Also however, if I've learned anything from experience, ignoring conservation law within any endeavor (except theology) engenders assured failure regardless of academic background. It never ceases to amaze me, the number of people in high positions of authority with supremely impressive credentials (in academics and especially in politics) that have no understanding of conservation law. I call it the "get something for nothing" syndrome. It's not only irrational; it's generally unethical and oftentimes downright frightening.

At any rate, also as a child, I was fascinated with astronomy (still am for that matter), but I was thoroughly bewildered with the idea of "infinity." Obviously, infinity (the inverse of zero or the inverse of a creation point) is a direct violation of conservation law. Mathematicians regard infinity simply as an "undefined number." I like that; it pretty well says it all. So obviously, it didn't make any sense to me that the Universe could be infinite. Not from a scientific or mathematical perspective anyway. As a child I was perplexed by this, and I can remember often times lying in bed until late at night trying to envision the nature of the Universe and how it could be infinite. But always to no avail.

Then one day my older brother came home from school and told me that his science teacher said that Einstein thought that if a rocket ship flew away from the earth in a straight line and just kept going, it would eventually return to the earth.

I didn't exactly know it at the time, but I had just encountered a perception of nonlinear field theory. Nevertheless, it was the most fascinating thing I had ever heard. I was twelve years old and remember it as if it were yesterday. That was sometime in 1956, the year of Einstein's last publication and the year following his death.

Finally, thanks to Einstein (via my brother's science teacher) I had come across something that possibly makes sense about the so-called "infinite" Universe.

It's <u>not</u> infinite, it's nonlinear.

Of his accomplishments in theoretical physics, the non-symmetric field was Einstein's last and most paramount insight. And as far as I know, except for me, <u>no</u> one has given any attention to it.

For this reason, I'm dedicating this writing as an acknowledgement to Albert Einstein.

Preface

The Big Bang Theory was conceived at some point after Edwin Hubble discovered the red-shift of galaxies in the 1920's*. Since then many cosmologists have spent their entire careers trying to verify it. For some 100 years, scientists have been unable or unwilling to develop a viable alternative to the Big Bang. Instead, they've desperately been trying to justify the inadequacies of prevailing concepts. Unfortunately, because of this, there has been little discussion of any plausible reason for the "appearance" of an expanding Universe (supposedly caused by some sort of mammoth explosion).

> *[Actually the theory of an expanding Universe originally came from a Belgian priest named Georges Lemaître [8e] in 1927. Apparently he was the first to publish a derivation of Hubble's Law. This was two years before Hubble's publication on the subject. It appears that Hubble may have taken credit for a hypothesis that was not his. To me that doesn't seem surprising, nor is it surprising that a priest was the first to establish Hubble's Law.]

It has become far too simple to accept the Big Bang as "beyond a reasonable doubt." In reality, it's absurd for a scientist to think that about any theory, especially one as flawed as the Big Bang.

It's vital that scientific theory (a <u>*conceptual definition*</u>) obey the principles of Scientific Method: <u>*empirical definition*</u> (an observed occurrence) and <u>*analytical definition*</u> (a mathematical model of the conceptual definition that follows conservation law and proven mathematical solutions). These are the basic foundations of achievement in science.

The problem with the "expanding Universe" is that it's based on an incorrect empirical definition and is thus mathematically and scientifically defective. It has no viable analytical solution. The only sensible account is an exponential (or nonlinear) description of the continuum.

Einstein understood this, but no one has been able or willing to advance his concepts of nonlinearity. Unfortunately, the mathematics and physics communities are virtually ignoring the obvious nonlinear character of the Universe in favor of linear mathematics.

However, anyone with a basic understanding of differential calculus should have sufficient background to comprehend nonlinearity and thus should be capable of understanding the concepts of cosmology written here. Any scientist proficient in higher mathematics should be able to do that.

Make no mistake; the concepts presented here are in direct conflict with the Big Bang Theory and plausibly negate the notion of an "expanding Universe." This theory defines a nonlinear space continuum in accordance with the Einsteinian non-symmetric field theory. The cause of the "red shift" is expressed as the derivative (slope) of the curvature (or skew) of the space continuum with respect to approached linearity, rather than a velocity variance with respect to distance as expressed by Hubble's Law.

Be assured there are no allowances in this writing. This thesis is mathematically correct, and without compromise, strictly adheres to proper Scientific Method.

Chapter 1
Scientific Method

Prelude

A theory itself is simply an idea or concept that may seem reasonable but has not been scientifically verified. So, we define *theory* as a *conceptual definition*. Proof or verification of a conceptual definition requires basically two things: a **valid** *empirical definition* and a **valid** *analytical definition*. These must coincide, and also each must stand alone on its own merit. If not, in either case, then we have what can be described as *pseudoscience*:

"*Pseudoscience* is a claim, belief or practice which is incorrectly presented as scientific, but does not adhere to a valid scientific method." [8f]

The Elements of Scientific Method

Conceptual Definition is a theory or belief: basically a "concept" or idea without proof

In essence, to prove a *conceptual definition* (theory), proper scientific method requires correct empirical and analytical definitions described following:

Empirical Definition is simply an observed occurrence. Unfortunately, what we see (or witness) is always unreliable. That is, "Things are not always as they appear." This is a major problem in science (and also in life). The history of science is full of empirical misconceptions. It has been proven over and over throughout history that empirical findings are in fact, usually incorrect. Therefore, in order to verify an *empirical definition*, it must be proven by proper mathematical derivation.

Mathematical derivation we may refer to as *Analytical Definition* defined as follows:

Analytical Definition is essentially a valid mathematical model of the theory. This is the most difficult part of theory verification. In fact, a scientist must be a proficient mathematician (and all too often that does not seem to be the case). In analytical verification, conservation law plays a vital role as well as proven mathematical and scientific principles. Following are common mathematical fallacies that can be defined as *pseudoscience*:

1. Failure to "conserve" mathematically. Very simply, two plus two equals four, not three or five. In science, no matter how hard you try, there's no getting around it. Conservation law dictates this. An entity may change or evolve from one state to another, but "nothing is created or destroyed" in science and the same is true in mathematics. If your mathematical derivations indicate otherwise, then there is something wrong with your analytical definition.

2. Attempting to equate things that simply are not equal. Pertaining to mathematics, perhaps this happens when "identity" is confused with "equality." Following are two basic requirements in order for an equal sign to be applied properly in mathematical derivation:

A. The equal sign may refer to a "cause and effect." An example of this would be a well-established fluid dynamics relationship between liquid flow and applied pressure, $Q = k\,(p^{.5})$. Here the flow (Q) is proportional to the square root of the pressure (p). In essence, the pressure is the force that is causing an incompressible fluid to flow through an orifice of some sort. If the pressure (force) is increased, the flow will also increase. This is an example of an equal sign representing a "cause and effect." The "k" is a constant. This pertains to conversion of the unit dissimilarities on each side of the equation, the size and shape of the orifice, the viscosity of the liquid and a retarding friction factor in the orifice). Theoretically all parts of the k remain constant, thus if the pressure increases so must the flow increase (as a square) in order to maintain both sides of the equation as "equal." [The inverse square law and the fundamental motion laws are other examples of this type of mathematical equation.]

B. Both sides of the equation are exactly the same thing. Another valid analytical (or mathematical) concept of an equation requires the exact same thing on each side of the equal sign. For example, we might say, "Two cars plus two cars equals four cars." This is a scientifically valid analytical definition only if we are talking about the exact same cars on each side of the equal sign. To further exemplify this, suppose we said, "Two Chevrolets plus two Chevrolets equals four Cadillacs." All of a sudden this mathematical analysis gets very complicated and requires further definition. Although there is the same number (of cars) on each side of the equal sign, this equation cannot scientifically be called "equality." What exactly are we talking about? Are we talking about the price of an automobile, reliability, safety, amenities, luxury, availability, etc.? Are the Cadillacs old and the Chevrolets new? Are the Cadillacs new and the Chevrolets antiques? Are you a car salesman, a potential buyer, an antique car collector, a car thief or what? Often an equation may seem perfectly valid, but if we have different entities on each side of the equal sign, the possibilities appear to approach infinity, and our derivation doesn't make any sense. Not scientifically anyway. [A good example of an equation that is analytically valid is $E = Mc^2$. Here the energy and the mass are two different forms of the exact same thing. It's not necessarily empirically evident, but right or wrong the equation is analytically valid only if the energy and the mass represent the same thing. When that is not the case, the equal sign is not scientifically valid in this type of mathematical application.]

3. Forcing an analytical definition. Another failure of mathematical application happens when a mathematical derivation is forced on an empirical (observed) occurrence but doesn't work in any other application. In other words, mathematical analysis must be derived independently of a specific or single observation. As stated previously, history is full of empirical misconceptions. For example, a magician can make a coin disappear right before your eyes. The analytical definition of this would be that one coin equals zero coins for this specific occurrence. That's "forcing" a mathematical derivation on an observed (empirical) occurrence that's obviously incorrect. One coin does not suddenly equal zero coins. The magician fooled you. You observed something that didn't actually happen. [The Hubble Equation, $v = H_oD$ is a good example of "forcing the mathematics to fit an observed occurrence" where the mathematics doesn't work in other application. Here Hubble observed (*empirical definition*) a proportional relationship between the distance to a galaxy, *D* and its so-called recession velocity, *v*. **In reality however, we cannot derive velocity by multiplying a constant by a static distance.** The math and the physics are simply incorrect.]

4. Limits of a mathematical equation. This generally refers to a "cause and effect" derivation as described in paragraph 2A preceding. Failure to realize that mathematical equations have limits may be the most misleading concept of analytical definition. Most "cause and effect" equations (perhaps all presently known equations) only work properly between specific parameters. That is, an equation may work perfectly well under certain conditions but not work at all for other conditions. You may have heard something like, "The laws of physics remain the same throughout the Universe." From a mathematical basis, this's simply not true. At least it's questionable as we understand science at this time in history. For example, if that were true, the fundamental motion laws would be "cast in stone," and there would be no perturbation to Mercury's orbit. Mathematical differences in pressure variance between laminar and turbulent liquid flow in a pipeline is a further illustration of this. Another example is that water expands when it freezes when other liquids shrink when they freeze. [However in my opinion, "dark matter" is the best example of failure to realize the limits of mathematical equations. Now, I don't know if dark matter exists or not, but the premise of the theory of dark matter is the assumption that Newton's Inverse Square Law and Kepler's Laws of Motion are absolute. In

other words, the orbits of stars in a galaxy should follow the exact same rules as the orbits of planets around a star. That however is not the case, and thus presents a dilemma. Now, we can resolve that dilemma by simply injecting more mass into a galaxy. But, you may ask, "Where is this mass? I can't see it. There is no empirical evidence of it." So, we fix that problem by simply calling it "dark matter." You can't see it because it's dark. Problem solved! And that is supposed to be proper scientific method? Did it ever occur to anyone that equations that work for a little solar system (that's several billion kilometers across with a star at the center) may not work for a galaxy (that's some 100,000+ light years across with a black hole at the center)? We humans aren't even capable of comprehending 1 light year, let alone 100,000. Could it be that those little 2's for exponents (in fundamental motion laws and in the inverse square law) might not actually be constants, but may in fact be variables? After all, as previously stated, we already know that Mercury's orbit violates fundamental motion, why not the orbit of a star? It's not the observed amount of matter that's incorrect. It's the derivation that's incorrect.]

Summary

Conceptual Definition is a theory without proof, requiring *empirical* and *analytical definition*.

Empirical Definition is observed evidence of the validity of the theory, however is unreliable and must be verified by proper *analytical definition*.

Analytical Definition is mathematical verification (of the theory) requiring the following:

1. Adherence to the conservation laws of physics.
2. (A) There must be either a "cause & effect" relationship between both sides of an equal sign, or (B) the entities on each side of an equal sign must be the same thing.
3. The equations must be developed from proven mathematical derivation. That is, the math must not be "invented" by forcing the math to verify an incorrect empirical definition.
4. Realization, that in application of physics, mathematical equations have limits.

If we fail to follow proper Scientific Method, we are left with *pseudoscience*. You would think by this time in history pseudoscience would be a thing of the past. As we will see, that's certainly not the case.

[Side Note: Here's an interesting philosophical and personal side note: the preceding paragraphs 3 and 4 bring up a curious concept pertaining to the difference between an engineer and a scientist. Being an engineer, I'm of the opinion that a real engineer must also be a scientist to some extent (or at least have an appropriate understanding of science), whereas a scientist does not necessarily have to be an engineer. The difference can be defined in the application of each discipline. That is, the engineer uses the laws of science and mathematics, but the scientist derives the laws of science and mathematics. This is similar to the difference between a judge and a legislator. The judge (like an engineer) implements the law while the legislator (like the scientist) writes the law. And of course the judge is not supposed to "legislate from the bench." Nor is the engineer supposed to make up or invent his own laws of physics or laws of mathematics. The reverse is true as well. For example, the "invention" of dark matter (expressed in paragraph 4) appears to be an attempt to "reengineer" a galaxy. That's not what I would call "science." As Einstein did with Mercury's orbit, the proper approach for a scientist would be to derive a suitable equation to define fundamental motion of a star within a galaxy (which is evidently different than fundamental motion in a linear coordinate system). With due respect, Kepler and Newton didn't even know that galaxies exist. I could be wrong, but the invention of dark matter in my opinion is scientifically inept. This appears to be an unwillingness to recognize incorrect conventional theory and a failure to develop more plausible mathematical and scientific concepts. This also represents to me (in a more advanced sense) a total ignorance of nonlinearity.]

Chapter 2
Linear Cosmology

My definition of Scientific Method (expressed in the previous chapter) is similar to the ancient Greek logic derivation known as a syllogism. If you have ever taken a Logic course you should know that if the premise is incorrect, the conclusion is most likely also incorrect. If it isn't incorrect, you just got lucky. Failure of scientific theory is usually in the premise of it.

As will be seen following, this failure is certainly evident in the premise of the Big Bang Theory.

Prelude

We live our lives as if the surface of the earth is flat. Up is up and down is down, and as far as we are concerned that's about it. Of course, we know that the surface of the earth is actually curved; however, it exists at an approached linear state relative to you and me. The surface is so close to flat (excluding mountains, hills and valleys) in our immediate surroundings that we can't tell otherwise.

So, why does the surface of the earth appear to be flat (linear) relative to you and me?

The reason is that we are very small and in close proximity relative to the size of the curvature of the surface of the earth. In essence, the smaller we are relative to the size of the curvature and the closer we are to it, the more linear the curve becomes. For example, suppose you are in a spacecraft traveling from the moon toward the earth. At first, from your vantage point the surface of the earth is obviously curved, in a spherical shape. As you get closer and closer to the earth however, the earth becomes larger relative to you and the curvature becomes more and more linear relative to you. When you get to the surface of the earth (in close proximity anyway), from your viewpoint the surface has become flat.

The size and distance relationship to a curvature I refer to as "relative linearity" or "approached linearity." (This is the result of a nonlinear phenomenon known as *perspective variance*.)

Although the preceding analysis seems evident, it appears to me that the concept of "approached linearity" is not at all well understood in science. Understanding the concept of approached linearity (the perspective variance) will become a very important issue in this thesis.

At any rate, it's not unreasonable that ancient civilizations most likely believed the earth is flat. However, mariners, at least as far back as the ancient Greeks, realized a bigger picture. Visualize this: you are standing on a beach looking out over a calm ocean. At your reference point, the surface of the ocean represents a linear (flat) plane, but we know that the surface of the ocean is in fact nonlinear (curved). This is easily observed by watching (from shore) a ship travel out to sea. As a ship moves out to sea, at first it appears to be traveling on a perfectly flat surface, but as the ship continues to the horizon and beyond, it's observed to go downward as if over a curvature, and the last thing that is seen from shore is the top of the mast. That's a pretty good argument against the notion of a flat earth.

Now, let's take this a bit further. From Newtonian differential calculus, there's more to this story. As the ship moves out to sea, there's another phenomenon that occurs. The ship tilts forward away from the observer. The greater the ship's distance the greater its forward tilt (relative to the observer).

In more scientific terms, the slope of the ship, relative to the observer, is directly proportional to its distance from the observer.

The *slope of a curve* is defined as the magnitude of the change in direction described as the "rise over the run" (+ or -) of the curve, at a particular fixed point on the curve, relative to a reference point held fixed in a linear coordinate system.

[It's important to define the types of curves discussed in this paper. Here a "continuous curve" is defined as a curve with either an increasing or decreasing slope relative to distance from a reference point assumed to be held fixed. A curve can also have a varying slope that fluctuates (between + and –) and can also be concave upward or concave downward (either increasing or decreasing).]

This "slope of a curve" is derived mathematically with differential calculus. However, although differential calculus defines the slope of a curve, **it's also used to define velocity**.

The definition of velocity as a *differential* and its relationship to the Doppler Effect is the key to a mathematical fallacy that led to Hubble's Law and the incorrect premise of the Big Bang Theory.

The Postulates of Cosmology

At the time of this writing, the scientific community has accepted the following hypotheses; we may call the *Postulates of Cosmology* [2]:

1st Postulate: The Big Bang occurred.

2nd Postulate: The Universe is expanding.

3rd Postulate: The Universe is "flat" (linear).

Today cosmologists will say these postulates are proven by observation (*empirical definition*). However, as stated previously, empirical evidence is unreliable.

The 2nd Postulate is the direct result of the 1st Postulate and is deduced from observance of the "red-shift" (of distant celestial bodies) assumed to be caused by the Doppler Effect that in turn is caused by "recession velocity."

The 3rd Postulate is problematic because, as will be discussed later, there is nothing in the Universe that appears to vary linearly. So, why would the space continuum (Universe) be flat? The 3rd Postulate is subjective and furthermore, may in fact be construed as a violation of conservation law.

The following supposition will focus on rendering the 2nd Postulate mathematically implausible. As we will see, this discredits the 1st Postulate by default.

Flawed Premise of Hubble's Law

Here we will conduct an experiment (mind game) to demonstrate a well-established and accepted premise that is actually mathematically incorrect.

Experiment #1

[Note that you do not have a radar gun and your eyes aren't good enough to determine the elongation of light waves reflected off of the back of a moving automobile. That is, as shown following, neither distance/time differentials nor the Doppler Effect provide an answer to the question presented in this experiment.]

> Visualize that you are standing on the shoulder of a highway, and you have in your hand a camera with a fast shutter speed. Now an automobile goes by, and you step out onto the highway and take <u>one</u> snapshot of the automobile, as it's moving away from you. By looking at the snapshot, you can tell where the automobile was when the snapshot was taken and you know where you were, when the snapshot was taken. Therefore, you can measure the distance between you and where the automobile was at the instant you took the picture.
>
> This is a <u>static distance</u>, x (from you to a moving automobile) at an arbitrary instant of time, t.
>
> Our question is this: **from this measurement *x* <u>alone</u>**, is there some way that we can derive the velocity of the automobile? The answer is obvious: <u>No</u>, we can't. Just by determining the static distance to the automobile (at some instant of time) we simply do <u>not</u> have enough information to determine the automobile's velocity.
>
> The reason we can't determine the velocity is that the static distance to the automobile has <u>no</u> relationship to the automobile's velocity. The distance could be anything, and the velocity could be anything. The <u>only</u> thing the snapshot tells us is where the automobile was when the picture was taken, <u>not</u> how fast the automobile was going.

With that said, we will now take a look at the derivation of Hubble's Law, the most celebrated equation of cosmology, the very premise of the Big Bang Theory.

Visible light can be broken down into wavelengths ranging from red to violet. This is called the "spectrum" of visible light. A light source emits an array of wavelengths at different intensities depending on what element is responsible for the light. For this reason each element (heated to incandescence) emits light with a unique pattern of wavelengths called "emission line spectra." By analyzing the line spectra of a light source we can determine from known experience what element is associated with the light source. For example, the hydrogen burning in a star emits light with particular emission line spectra that is identifiable.

When Edwin Hubble discovered galaxies back in the 1920's he didn't know what they were. All he knew was that they were very distant light emitting entities that were farther away than the visible stars. So, to try to find out what they are made of, he performed a "spectrum analysis." He found that the line spectra of a galaxy looked very much like that of a hydrogen light source. Now, that is certainly reasonable since hydrogen is the most abundant light source in the Universe. Most stars are predominately made up of hydrogen. However, there was a bit of a problem with his analysis. The light wavelengths were ever so slightly elongated. That is, the hydrogen spectral lines were shifted a little toward the red end of the overall visible spectrum. This <u>elongation</u> of the light wavelength of course is known as the "red shift" of light emitted from distant celestial bodies.

It was further deduced that this elongation of the light waves (red-shift) is caused by the Doppler Effect (or Doppler Shift). This is the phenomenon that light wavelengths will vary, relative to an observer, <u>if</u> the light source is in motion with respect to the observer. In short, if the light source is moving <u>away</u> from the observer, the light wavelength will elongate relative to the observer. Or we may say the wavelength is "red shifted" do to the outward motion of the light source. This light wavelength elongation or Doppler Effect is proportional to the relative speed. That is, the <u>faster</u> the light source is moving away from the observer, the greater the elongation of the light's wavelength, relative to the observer.

So, this red-shift (wavelength elongation) of light emitted from distant galaxies appears to be the Doppler Effect and indicates that galaxies are moving away relative to an observer here at the earth. This outward motion, associated with the red-shift, is called the "recession velocity" of the galaxy. From observations of other galaxies, it became evident that the red-shift is the norm in all directions, and therefore, the Universe is assumed to be expanding (blowing up like a big balloon).

Now, it's not an unreasonable assumption that the elongation of light waves (red shift) is the Doppler Effect that in turn is caused by recession velocity. However, it was the next discovery by Hubble that should have indicated to him an obvious flaw in his assumption.

Hubble found that this wavelength elongation (Doppler Effect) is directly proportional to distance. That is, the farther away a galaxy, the greater the Doppler Effect, and thus the greater the recession velocity.

Unfortunately, Hubble (along with the entire scientific community) failed to realize that although **the Doppler Effect is proportional to speed, the Doppler Effect is not proportional to distance.**

Anyway, after further study of more galaxies, Hubble also found that the ratio of a galaxy's recession velocity to its distance appears to be a constant. This ratio is known as the Hubble Constant, H_o*.

Mathematically it looks like this: $v = H_oD$ (Hubble's Law). Where v is the recession velocity of the galaxy and D is the distance to the galaxy. And thus, the Hubble Constant is equal to the ratio of a galaxy's recession velocity to its distance (v/D).

> *[It must be noted that an astronomical experiment that was performed in 1978[4] [9] has shown that the Hubble Constant is not really constant. Unfortunately cosmological scientists, in an attempt to retain the notion of an expanding Universe, have misconstrued this variance (of the Hubble Constant) to be "acceleration." In reality, the concept of "recession acceleration" is equally as absurd as the concept of "recession velocity." This phenomenon will be properly explained later, but for now we'll stick with "recession velocity" just to keep it simple.]

I must contend that it appears that Hubble was not what I would call a physicist, because as stated previously (see *Experiment #1*), by scientific definition his equation doesn't make sense. **Again, you cannot derive velocity by multiplying a constant by a static distance.** In reality, a static distance and a constant are scalars and velocity is a vector. This is a prime example of a violation of Scientific Method with an "invented equation" that is forced to fit an erroneous empirical definition.

Velocity is a ratio of two differentials (a change in length with respect to a change in time). As shown in *Experiment #1*, any physicist should know that there is no mathematical relationship between a moving object's static distance (at an instant of time) and its velocity.

So how can this be? How can the recession velocity of a galaxy be proportional to the galaxy's distance? How can the Doppler Effect vary with respect to distance?

The answer is obvious. **The cause of the red shift is not the Doppler Effect. The red shift is caused by the variance or skew of the nonlinear space continuum.**

In other words, the elongation of light waves (red shift) is caused by the variance of the slope of the curvature of the space continuum relative to distance. **And clearly, whereas velocity is not proportional to distance, the slope of a continuous curve (defined by differential calculus) can easily be shown to vary proportionally with distance.**

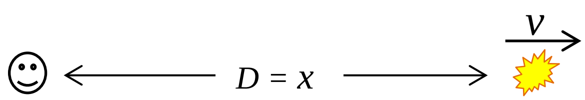
Remember the ship tilting forward as it moves out to sea, relative to the observer on shore? The slope of the ship is proportional to its distance from the observer, but the slope is not proportional to the ship's velocity. In essence, the ship could go way out to sea and come to a complete stop, and it would still be tilted forward relative to the observer on shore.

Again, relative to the observer, the ship's distance is proportional to the ship's slope, but the ship's distance is not proportional to the ship's velocity.

Evidently Hubble was not much of a mathematician either. At least it appears he had no understanding of differential calculus. If he had, when he found the so-called recession velocity to be proportional to distance, he would have realized the mistake in his equation.

Velocity is a particular case of differential calculus. However to reiterate, the differential calculus does not only define velocity, it also defines the slope of a curve. Furthermore, and most importantly, the slope variance of a nonlinear continuum will also cause light wavelength elongation that is proportional to distance. This will be clarified in more detail, in the next two chapters. Following however, we will show the mathematical discrepancy in Hubble's equation:

First we will substitute *x* for *D*. The distance to a galaxy becomes *x* instead of *D*. This is simply a matter of semantics, but there's a reason for this substitution that will become clear in a moment.



So, the Hubble equation becomes:

$$v = H_o\, x$$

Where *x* is the distance to a galaxy, H_o is the Hubble Constant and *v* the recession velocity. Thus, the recession velocity of a galaxy is proportional to the distance to the galaxy:

$$v \propto x$$

Now, when we define velocity with *differentiation* (calculus) the equation becomes:

$$\frac{dx}{dt} \propto x$$

This relationship obviously doesn't make sense. It is seen that the *x* on the left side of the equation is a differential: a change in distance outward away from an observer, but the *x* on the right side of the equation is simply a static distance from the observer to the galaxy at an arbitrary instant of time. Simply stated, the *x* on the left side of the equation is not the same thing as the *x* on the right side of the equation. **They are in fact independent of each other, thus negating the validity of the equation.**

Summary

Hubble's analysis is based on an assumption that the Doppler Effect somehow varies relative to distance. This assumption is made from observation alone (*empirical definition*). Consequently, the resulting mathematics (*analytical definition*) simply doesn't work in any other application.

Very simply: you can't derive the velocity of a moving object by multiplying its instantaneous distance by a constant.

That's not at all unreasonable (although it should be). As previously stated, throughout history *empirical definition* is all too often unreliable and leads to pseudoscience.

Chapter 3

Dismissal of the 3rd Postulate of Cosmology

Prelude

Showing that the Hubble equation doesn't work is not enough. Now we have to explain why or how the nonlinear field would create the "appearance" of the Doppler Effect and thus the "appearance" of an expanding Universe. Basically, we need to define what a nonlinear continuum is and find an analysis that is mathematically viable.

Again, velocity (the cause of the Doppler Effect) is not the only thing defined by differential calculus. Differential calculus also defines the slope of a curve.

The Nonlinear Field

Graph 1 shows the plot of a *nonlinear* continuous curvature subscribed within a *linear* frame of reference. This is the most common way a curvature is described in science. **The graph is linear. That means the units or increments remain constant throughout the continuum (an inch is an inch; a meter is a meter, etc.).**

We define the equation of a curvature, in terms of *x*, as *f(x)* (a function of *x*):

$$y = f(x)$$

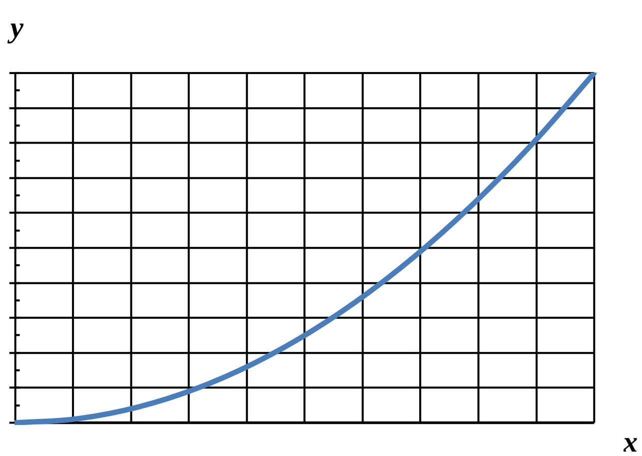
And differentiate it to find the slope equation of the curve:

$$\frac{dy}{dx} = \frac{d[f(x)]}{dx}$$

Unlike the Doppler Effect, the slope is directly proportional to the distance *x*. The *x* on the right of the equal sign is the same thing as the *x* on the left of the equal sign. **That is, as *x* varies so does the slope**.

$$\frac{d[f(x)]}{dx} \propto x$$

Graph 1 – **Linear** Graph (continuum) with **Nonlinear** Curvature

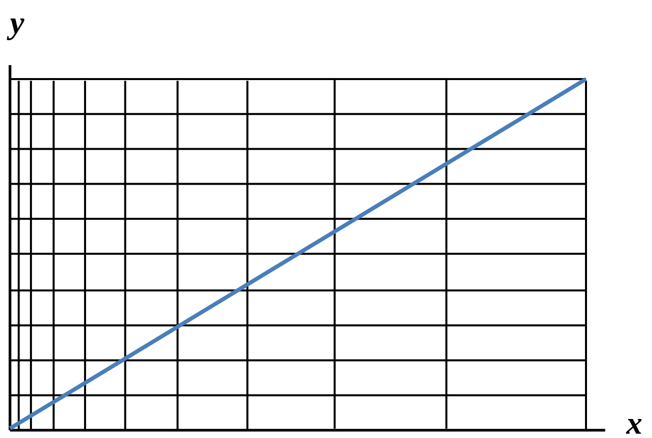


This is the actual cause of the red shift. The greater the distance to a galaxy (*x*), the greater the slope (or skew) of the continuum relative to an observer and thus, the greater the red shift.

However, there is a problem with the graph itself: the coordinate system (or continuum) in Graph 1 is linear. The concept of this thesis is that the Universe is not a linear system. So we correct this by "skewing" the *x*-axis into a nonlinear variance as shown following in Graph 2:

Graph 2 shows a skewed or nonlinear space continuum along the *x*-axis. This shows graphically how the light wavelength (red shift) varies relative to distance in a nonlinear continuum.

Graph 2 - Nonlinear Graph (continuum) with **Linear** Curvature



Graph 2 is a plot of the same data that is shown in Graph 1, except it's a *linear* curvature subscribed within a *nonlinear* frame of reference (or nonlinear continuum). **In Graph 2, the *x*-axis is skewed so the increments (along the *x*-axis) increase relative to distance from the origin.** This is an exponential graph such that the subscribed curve has become a straight line. Here the increments along the *x*-axis vary to mathematically coincide with the curve. **The *x*-axis depicts a nonlinear field. Graph 2 is the plot of a *linear* continuous curve subscribed within a *nonlinear* coordinate system.**

Now, visualize that the origin in Graph 2 can be any point in the Universe. Thus, relative to an observer (at any point), the Universe varies as shown in the graph. **In essence, the observer is at the origin and is looking out into the Universe along the straight line subscribed in the plot and thus would see no curvature to the continuum.** However, the units (increments), along the *x*-axis, elongate proportionally with distance from the origin. **Obviously the wavelength of light, emitted from a celestial body, will follow this "spatial" elongation with respect to distance from the origin.**

That is the cause of the red shift. The red shift is caused by the nonlinear variance of the continuum itself. The Doppler Effect has nothing to do with it.

> [Side Note: The exponential coordinate system shown in Graph 2 is not new. For years, engineers have used exponential graphs in order to plot nonlinear variables with a straightedge. However, the validity of such spatial variance may reasonably be in question. That is, we may ask whether an exponential variance (as depicted in Graph 2) actually exists or is just an engineering tool (as Big Band theorists evidently believe). In reality however, this nonlinear "spatial variance" appears to be the norm rather than the exception. This will be discussed in the next chapter.]

Summary

Following is the incorrect premise of Hubble's Law compared to the correct premise presented by the nonlinear field concept:

Incorrect Premise: velocity (defined with differential calculus) causing the Doppler Effect assumed proportional to distance, as Hubble imagined, is analytically incorrect:

(1) $\frac{dx}{dt} \propto D$ Incorrect analytical definition

Correct Premise: Differential calculus as the slope of a continuous curve (with an increasing slope) is proportional to distance. As the distance (x) varies, so does the slope:

(2) $\frac{d[f(x)]}{dx} \propto x$ **Correct analytical definition**

Currently, the prevailing assumption is that the Universe is linear ("flat") but is somehow expanding (either as recession velocity or as recession acceleration) at an increasing rate relative to distance. As seen in Equation (1), this has no scientific or mathematical credence. The left and right sides of the equation are independent of each other.

However, as seen by Equation (2), the red shift is caused by the exponential variance of the nonlinear continuum, not by some sort of explosion (Big Bang). In fact, the red shift is reliable evidence that the Universe is not linear and reasonably refutes the 3rd Postulate of Cosmology.

Importantly, the preceding Equations (1) and (2) are both defined as *differentiation*, but they have very different meanings. Specifically, as defined by Equation (1), Hubble's assumption of "velocity" as a variable that is proportional to distance, is scientifically and mathematically incorrect. *The Doppler Effect does not vary relative to distance*. However, the differential calculus shown as Equation (2), defines the slope of a continuous curve that correctly varies proportionally with distance.

This was proven by Isaac Newton when he developed differential calculus over 300 years ago. [Even though he has a space telescope named after him, Edwin Hubble was no Isaac Newton. Not even close.]

In defiance of the currently accepted Postulates of Cosmology, we see a concept that is mathematically correct and precisely follows scientific method. The nonlinear skew of the continuum itself defines the increasing elongation of light waves relative to distance from any reference point in the Universe.

The corrected empirical and analytical definitions appear obvious: There's no reason the Big Bang occurred, the Universe is not expanding, and the Universe is definitely not flat.

However, although Einstein's vision of a nonlinear Universe discredits the premise of prevailing theory, thus far it provides only a hint of the true postulation of the Cosmos.

There still is no analytical definition. The question remains:

What is *f(x)*? What is the equation that defines the nonlinear variance of the space continuum?

Chapter 4
Exponential & Logarithmic Variance

Prelude

We may define concepts of mass and energy and relationships between them that correctly follow conservation law. These may be assumed as tangible in the realm of science. However, we describe space as a void, as "nothing." Space is not at all tangible by this definition.

For example, consider a cylinder closed at one end with a sealed piston inside. As we draw back the piston, a vacuum (or void of space) is "created" within the cylinder. We can very accurately define the force to draw back the piston and the displacement of the mass of air from within the cylinder. The mass and energy precisely follow conservation laws of physics. But where did the "space" come from? How did it get into the cylinder? Did we really "create" it in absolute violation of conservation law, or did we perhaps steal it from some other part of the Universe? Space is something. It has length, width and depth and is measurable. It was here yesterday and is here today. It obviously exists. Is it reasonable that the space continuum in its entirety follows conservation law?

If it does not, one thing is for sure: a scientific definition of it is virtually impossible.

With that said, it seems that a definition of the Universe as a space continuum is purely of a mathematical nature. If there is a definition of it, it appears we have only the dimensions of space and the laws of mathematics to work with.

Mathematical Principles of the Nonlinear System
Incremental Variance

To mathematically define the *nonlinear* space continuum, we first must define a nonlinear coordinate system. This is shown in the previous chapter as a skewed two-dimensional *nonlinear* coordinate system with exponential variance along the *x*-axis.

In mathematics, a "linear" is defined as straight (as a straight line or flat surface) and a "nonlinear" is defined as curved. A "variance" is a linear or a nonlinear path plotted relative to a "coordinate system." The linear coordinate system we define as a two-dimensional plane or a three-dimensional linear space continuum (or a four dimensional linear continuum*).

> *[The four dimensional space continuum is certainly an ingenious concept, except for a couple of things (in my opinion). First, the four dimensional concept is a bit nebulous and difficult to understand, but more importantly, by simply adding a forth coordinate axis, the coordinate system still remains linear. To describe the nonlinear Universe we must look at the system differently, in essence, in reverse. In the general consensus of science today, we look at a variable entity within a fixed linear coordinate system. Conversely, the definition of a nonlinear system is the opposite of this. That is, an entity (variable) within the system is held fixed, and the Universe itself is considered variable (exponential).]

It's not difficult to comprehend a curved line or a straight line in a two or three dimensional system, but the concept of a curved (nonlinear) three-dimensional coordinate system (or nonlinear space continuum) is not readily apparent. In fact however, as expressed in the previous chapter, the concept of a nonlinear coordinate system has been around for a long time. **In the linear coordinate system, increments or standard units (such as inches, centimeters, etc.) remain constants, whereas in the *nonlinear***

coordinate system the increments (or units) vary, in a mathematically defined way, with respect to distance from an arbitrary reference point.

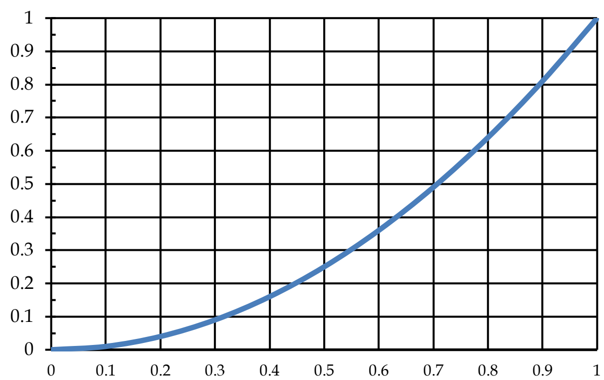
The following graphs illustrate two types of exponential variance, each within <u>linear</u> coordinate systems (Graphs 1A and 1B) and also within <u>nonlinear</u> coordinate systems (Graphs 2A and 2B).

Graphs 1A and 2A are of the same equation. The equation is a simple parabola: $y = x^2$. The x is the base number and the "2" superscript is the exponent. **Importantly, in this type of equation, the base number is variable, but the exponent <u>always</u> remains constant.**

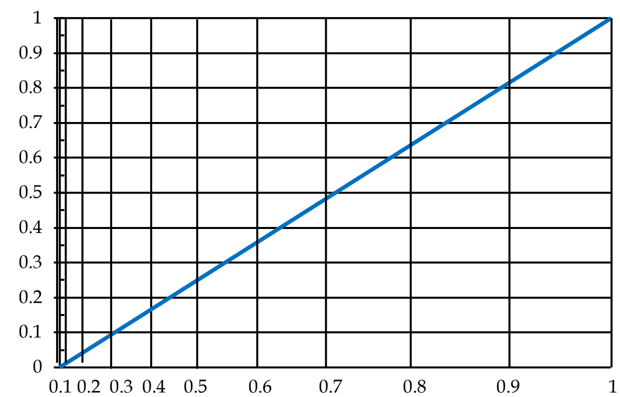
Graphs 1B and 2B are both of the same equation as well. These graphs show the curve subscribed by the logarithm of base 10 ($y = \log_{10} x$) with x plotted from 1 to 10. A logarithm is a variable "exponent" and varies nonlinearly (as a curve) relative to a linear coordinate system (as shown in Graph 1B). **In this type of math the exponent is the variable and the base number <u>always</u> remains constant.**

Graphs 1A and 1B thus represent typical <u>linear</u> two-dimensional continuums (coordinate systems) with uniform increments (the increments and units are constants and remain so). The Graphs 2A and 2B however, represent two-dimensional <u>nonlinear</u> continuums with increasing increments (increasing units) along the *x*-axis in Graph 2A and decreasing increments (decreasing units) along the *x*-axis in Graph 2B.

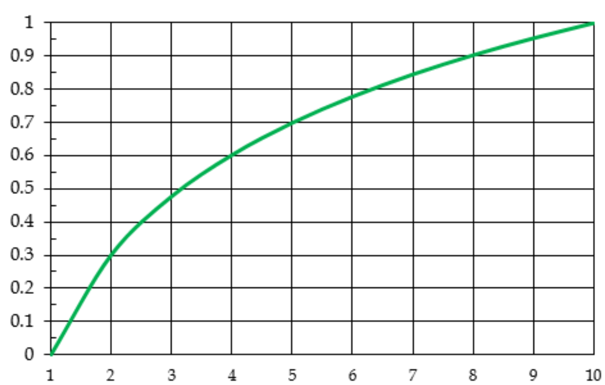
Graph 1A – Linear Graph: $y = x^2$



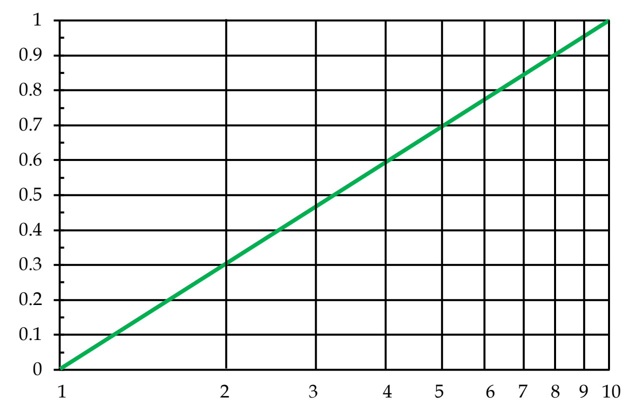
Graph 2A – Nonlinear Graph: $y = x^2$



Graph 1B – Linear Graph: y = **log (x)**



Graph 2B – Nonlinear Graph: y = log (x)



Significantly, Graph 1A and 1B show <u>linear</u> coordinate systems along the x-axis, and Graph 2A and 2B show <u>nonlinear</u> (or exponential) coordinate systems along the x-axis.

There is another <u>very</u> important concept that will become very significant later in this writing: the plot in Graph 1A is "<u>increasing, concave upward</u>" and the plot in Graph 1B is "<u>increasing, concave downward</u>."

Graphs 1A and 1B represent the Universe as "flat" as Big Bang theorists believe. This linear representation of the Universe also includes some mysterious recession velocity (or recession acceleration) that has no mathematical credibility. In the exponential Graph 2A however, it is seen that increments or units (and also the wavelength of a light source) would increase along the x-axis relative to distance from the origin. This graph represents a continuum variance that would account for a mathematically valid red-shift (light wave elongation) that varies with distance from a reference point. To reiterate, by this hypothesis the red-shift is caused by the nonlinear variance of the continuum itself (relative to distance from an observer), and is <u>not</u> caused by the Doppler Effect (recession velocity).

Although, the preceding Graphs 2A and 2B illustrate particular types of nonlinear coordinate systems, they do not illustrate the proper variance of the nonlinear Universe as we experience it. So again, we may ask: what is the actual equation that defines the curvature of the space continuum? We may also ask whether this concept of a skewed continuum is even feasible at all. The idea of a continuum variance therefore may be considered purely subjective, if we know of nothing in the Universe that follows exponential variance (incremental variance) represented by the exponential continuum variances shown in Graphs 2A and 2B. **In truth however, such spatial variance is the rule in nature, <u>not</u> the exception.**

For example, intensity of sound propagation measured in decibels follows a logarithm variance with respect to distance from a sound source. Sound tone variance is also exponential in nature (the fret board on a guitar is a good illustration of this). The inverse square law is a form of exponential variance defining the intensity of gravitational force with respect to distance. The perspective variance (the result of "vanishing points" characterized in paintings by artists) is an inverse nonlinear spatial variance (or perhaps a logarithm variance) that is evident to all of us. The examples of nonlinear variance go on and on. In fact, virtually all of scientific and engineering equations express exponential characteristics. Linear variance is actually the exception to the rule and may not exist at all in nature. **We may <u>approach</u> linearity, but true linearity may very well be unattainable.**

For the Universe to be flat (linear) makes no sense from another scientific point of view as well. In fact, we may say that a linear Universe violates conservation law, because it is assumed to have a beginning and no end. That is, it starts at a creation point or origin and extends to infinity. Conservation law however, is the most fundamental criteria of science. Science simply does not work without it. Should we encounter the "creation point," what tools would we use to define it? At such a point <u>nothing</u> exists, and therefore the laws of science and mathematics must not exist. How can we, by applying the laws of science, define a point where the laws of science don't exist? Here we may say that infinity and its inverse (zero or a creation point) are true singularities and must be excluded from scientific theory.

In the words of Einstein: "A field theory is not yet completely determined by the system of field equations. Should one admit the appearance of singularities? Should one postulate boundary conditions? As to the first question, it is my opinion that singularities must be excluded."[5]

> [Again it appears that Albert Einstein had it right, and modern cosmologists don't. The intent of this writing pertains to scientific validity, and science can only deal with what <u>actually exists</u>. However, it is not at all the intention of this writer to discredit a "belief" in an origin, because science simply can't do that. I contend that science can make no argument one way or the other, and concepts of infinity and creation must be left to other areas of philosophy.]

Chapter 5
Linear Mathematics

Prelude

A major problem with nonlinearity is that currently accepted concepts of mathematics are not at all compatible with the nonlinear system. Presently it seems that academic emphasis is only on "linear mathematics." In essence, the continuum must be linear in order for conventional mathematics to function correctly. Einstein addressed this problem by stating that a "significant progress in mathematical methods" [5] is needed to properly define the nonlinear system, and linear mathematics is "**only an attempt** to describe relationships of an essentially nonlinear character by linear methods."[5]

Importantly, linear mathematics requires that equations may define nonlinear variance (a curvature), but the coordinate system must remain linear, with no variance.

The following shows how three prominent derivations only work within a linear coordinate system. This also indicates why linear mathematics is incapable of properly expressing a nonlinear coordinate system.

Basic Linear Equations

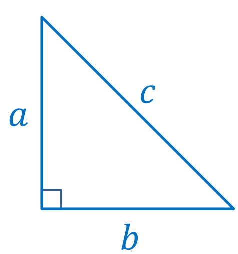
The following Second Theorem (also called the *First Condition of Linearity*) is taken from the primary reference book, *Premise Theories of the Micro Macro Correlation*. [11]

Second Theorem:

The limit of a variable, defined by the square root of a negative number, is valid only within a linear frame of reference (*First Condition of Linearity*).

The preceding theorem is easily expressed with the Pythagorean Theorem:

Figure 5-1



$$a^2 + b^2 = c^2$$

$$a = \sqrt{c^2 - b^2}$$

$$b = \sqrt{c^2 - a^2}$$

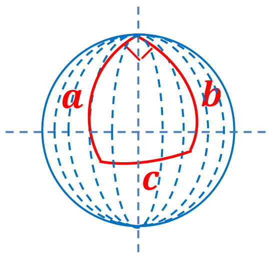
By simply observing a right triangle, it is seen that neither side can be of greater length than the length of the hypotenuse. This is verified mathematically by solving for either of the sides. As seen in the latter two equations shown in Figure 5-1, if either side of the triangle is greater than *c*, the right side of the equation is equal to the square root of a negative number, and there's no such thing as the square root of a negative number.

However, there's a critical premise to the Pythagorean Theorem concerning the fundamental concepts of Euclidean geometry (i.e., linear mathematics). **The triangle must be drawn on a perfectly flat surface**

(a linear plane), hence the *first condition of linearity*. In essence, the coordinate system must be linear in order for the Pythagorean Theorem to be valid.

For example, the theorem doesn't work if the triangle is drawn on the surface of a sphere, as shown in Figure 5-2. That is, on the surface of a sphere, a right triangle can be drawn with sides of greater length than the hypotenuse. Here we submit to Non-Euclidian geometry. The surface of a sphere is a nonlinear plane (a two-dimensional surface curved through the third dimension). Here it is seen that the Pythagorean Theorem doesn't work on a curved surface.

Figure 5-2



Nevertheless, the problem is not in the Pythagorean Theorem; it's in its premise. Obviously, when Pythagoras formulated the theorem, he was only referring to right triangles drawn on flat surfaces.

Also of note, in this derivation the base numbers are variables and the exponents are constants.

Fundamental Motion

The *condition of linearity* also abides to a three dimensional coordinate system as well. That is, the fundamental motion laws also follow the same "condition of linearity" expressed with the Pythagorean Theorem when defining orbital motion in a three-dimensional coordinate system (such as our solar system). In order for fundamental motion equations to work properly, the three dimensional coordinate system must be linear as shown following.

For the ellipse/hyperbola of the form:

$$Ax^2 \pm By^2 = 1$$

And also for the parabolic equation:

$$y = x^2$$

Fundamental motion is basically a modification of the Pythagorean Theorem. The coordinate system must be linear (or a closely approached linear state) or the equations won't yield accurate results.

Again, it's noted these linear equations incorporate exponents that are constants and thus, concur with the concept of a linear coordinate system.

Absolute Velocity

There is one more very important equation that only works within a linear system. This is the Lorentz Transformation.

Here we see that scientists have defined two different concepts of velocity: There's "relative velocity" and there's the "velocity of light" (that evidently isn't relative to anything).

The Lorentz Transformation looks like this: [6]

$$m = m_0/\sqrt{1 - v^2/c^2}$$

Where m_0 is a mass at rest, and m is the same mass in motion at some velocity, v.

By rearranging the equation, we see the right side of the equation is mathematically comparable to the linear mathematical basis of the Pythagorean Theorem, and here again the exponents are constants:

$$m_0c/m = \sqrt{c^2 - v^2}$$

The velocity of the mass is limited to the velocity of light as the square root of a negative number, just as the length of a side of a right triangle is limited to the length of the hypotenuse. Again we see the *first condition of linearity*. This indicates that the Universe must be linear in order for the Lorentz Transformation to work properly, and therefore, **the velocity of light is an absolute constant only in a linear coordinate system.**

This brings up an interesting point. If the Universe is nonlinear, "velocity" would not be limited to the velocity of light, and we should be able to violate the velocity limit of the Lorentz Transformation. That is, it is a very reasonable indication that the cosmos is nonlinear if we are able to show something that exceeds the velocity of light relative to a reference point held fixed.

So to do that, we first need a reference point. This reference point can be any point in the Universe, so the point we will choose will be at the surface of the earth, where you are. In other words, you are the reference point we will hold fixed.

Now suppose on a night, you are in your back yard (in a recliner) looking straight up into the sky and you see a star. As you watch that star for a while, you'll see that it's slowly moving across the sky. Well, not really slowly. Remember, you are the reference point held fixed. In fact, in a twenty-four hour period that star will travel around the earth (relative to you) and back to the point you first saw it.

The closest star to the earth (other than the sun) is about 4.3 LY away. So, whatever star you are looking at is at least that far away. In other words, with you held fixed, that star is traveling around you in an approximate circle with minimum radius of about 4.3 LY and minimum circumference of approximately 27 LY. That star is traveling a minimum of about 27 LY in a twenty-four hour period, relative to you.

Relative to you, that star is traveling farther in one hour than light travels in one year.

As a matter of fact, almost everything in the Universe is traveling faster that the velocity of light relative to you. This does not lend itself well to conventional theory. However, here again the problem is not with the Lorentz Transformation. The problem is in the premise of it. The transformation portrays the velocity of light as a constant only within a linear continuum. Evidently, the continuum isn't linear.

[I'm convinced that the velocity of light is actually a nonterminating decimal. In other words, it really isn't constant but is an approached constant, such as the Euler Number or π. I also contend that a nonterminating decimal is actually an asymptote. That is, the velocity of light is asymptotic to a linear state. This will be addressed in more clarity in a later chapter.]

Chapter 6
Basic Mathematical Principles

Prelude

It may be assumed that the space continuum appears to us as a state of linearity in our immediate vicinity just as the surface of the earth appears to be flat in our immediate vicinity. An individual is very small compared to the entirety of the earth and can only tell that the surface of the earth is nonlinear by observing a distant object such as a ship moving out to sea. Our solar system is also very small compared to the Universe, and we may say that we can only tell that the Universe is nonlinear by observing the red-shift of light emitted from distant celestial bodies.

Thus, within our solar system we exist at an approached linear state relative to the Universe as a whole.

For example, the motions of the planets about the sun can be calculated and plotted very accurately using fundamental motion law within a linear coordinate system. This indicates that the solar system (like the surface of the earth) is very close to a linear state in our immediate vicinity. However, the solar system is extremely small compared to the entire Universe. It's not unreasonable, that within our miniscule solar system, the space continuum is so close to linear that we can't tell otherwise.

The fundamental motion laws subscribe curvatures within our solar system defined with linear mathematics, evidenced by the motion of planets, moons and other satellites. But when we look farther out, we see a much different scenario defining the nature of the Universe.

The Universe approaches linearity at any point within the continuum, but the Universe in its entirety is obviously nonlinear.

Fundamental Mathematics

In this writing the terms "nonlinear variance" and "exponential variance" mean the same thing and express a mathematical curvature or variance from an approached linear state.

Generally, mathematical equations are expressed graphically in reference to a linear coordinate system. That is, the coordinate system is shown with linear (straight) axes, and units (or standard increments) are considered uniform and constant throughout the coordinate system. An equation however, may be nonlinear and will plot as a curve in relationship to the linear coordinate system, but the coordinate system itself is linear and constant (for example, the "flat" Universe that is apparent to our solar system).

An example of an equation that varies exponentially (as a curve) with respect to a linear coordinate system, was shown graphically in Graphs 1A and 2A earlier. This is the simplest of the fundamental motion laws called the parabola or parabolic equation:

$$y \propto x^2$$

For a particular application, the proportionality sign becomes an equal sign if certain constants or terms are inserted into the parabolic equation. Numerous forms of this equation are especially common in science and engineering. On the right side of the equation, the "2" is called the "exponent" and is held constant, and the x is called the "base-number" and is variable. We shall define this form of mathematical equation as follows:

$$x^a$$

Where the base number *x*, is a variable and the exponent *a*, is a constant. This we will refer to as **"variable base mathematics, with constant exponent."**

The second form of mathematics called the logarithm was shown graphically in Graphs 1B and 2B. In this form of equation, the constant and variable are reversed.

$$a^x$$

Here the base number is a constant and the exponent is the variable. This we will refer to as **"variable exponent mathematics, with constant base number."**

These are the only two forms of mathematics used in science today. Either the base number or the exponent is held constant.

In the words of Albert Einstein: The Relativistic Theory of the Non-Symmetric Field, *Appendix II, General Remarks Paragraph C*:

"We do not possess any method at all to derive systematically solutions that are free of singularities [zero and infinity]. For this reason we cannot at present compare the content of a nonlinear field theory with experience. Only a significant progress in mathematical methods can help here**.** At the present time the opinion prevails that a field theory must first, by quantization, be transformed into a statistical theory of field probabilities according to more or less established rules. I see in this method **only an attempt** to describe relationships of an essentially nonlinear character by linear methods."[5]

In science today (as in Einstein's time), we have only two forms of mathematics: **"variable base number" with constant exponent or "variable exponent" with constant base number.**

So, what else is there?

An interesting mathematical anomaly addressed in the following chapter will answer this question and will introduce an entirely unknown and very significant new concept of mathematics.

Chapter 7
Nonlinear Motion of Controlled Fluids

Prelude

The study of Fluid Dynamics pertains to fluid flow within a confined conduit (pipeline, ductwork, channel, orifice, etc.). A most interesting (and very complex) fluid dynamics enquiry is the relationship between pressure and flow of a non-compressible liquid within a pipeline. There are numerous equations that have been developed over hundreds of years that attempt to define this relationship, but none of them seem to work very well. The reason for this is partly because the variables associated with viscosity act differently for different liquids. In essence, one mathematical equation doesn't seem to work for all liquids, and at best, these equations seem to work well only within specific parameters. Thus, different liquids require different equations to define relationships between flow and pressure in a pipeline. In essence, "one size does not fit all."

As shown in the previous chapter, there are only two basic forms of mathematical equations:

1. Variable base number with constant exponent (example: $y = x^2$).

Or:

2. Variable exponent with constant base number (example: $y = \ln x$).

As Einstein stated, it will require advancement in mathematics to define the nonlinear field. Perhaps, there is some form of mathematics that is not confined to one or the other of these two conditions.

In fact, there is such an equation in fluid dynamics that does something very different and is also very conducive to an analytical definition of the nonlinear field. Specifically it pertains to mathematical derivation of pressure variance relative to water flow in a pipeline. It's called the Hazen-Williams Formula. [10] It seems however, that the academic community doesn't know about it. [Perhaps this's because the academic community doesn't like anything that's not defined by linear mathematics.]

In college I had learned that most everything in science can be defined with some variance of the fundamental motion laws, especially parabolic variance. Again, the parabola is the most common equation in science and engineering. It seems that some form of parabolic variance defines every relationship there is. In this form of mathematics the exponent is equal to "2" (or 0.5) and never varies. Only occasionally we run into logarithmic variance (variable exponent). But equations (or the terms within equations) are always one or the other: variable base number or variable exponent.

In the mid 70's a few years after I graduated from college (an engineering university), I went to work for an insurance loss prevention consulting firm owned by very large industrial insurance companies. They hire engineers, because an engineer's technical academic background is compatible with an understanding of industrial processes, mechanical systems, electrical systems, building structures, etc.

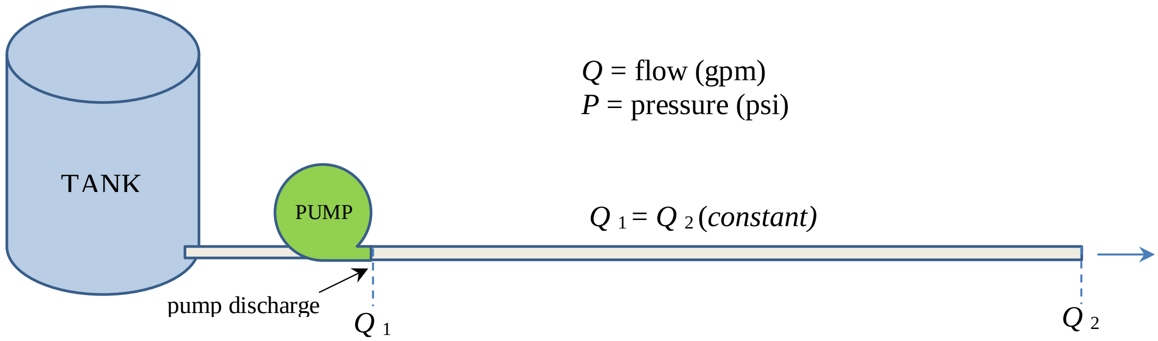
At any rate, as a part of my training in industrial loss prevention, I was sent to their research center to learn fire protection sprinkler system design. This is where I encountered the Hazen-Williams Formula.

As we will see, this formula (along with my voracious curiosity) led me to a concept of mathematics that is completely unknown to science at this time.

Fluid Dynamics

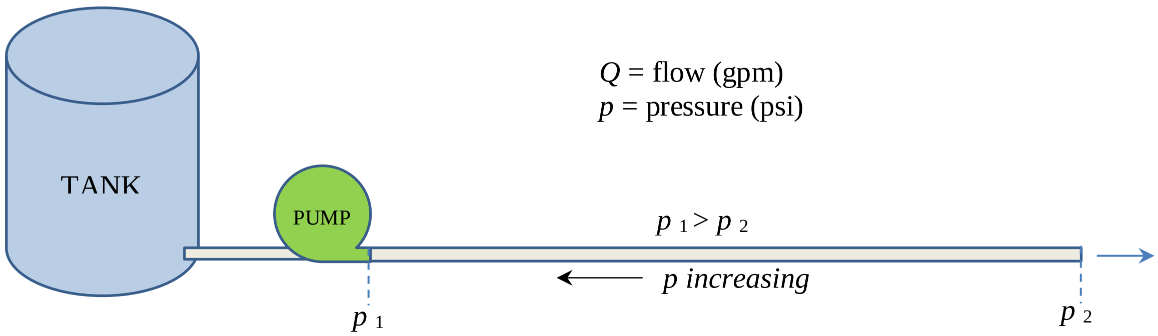
The following illustrations express how the Hazen-Williams Formula works:

Figure 7-1



In Figure 1, a pump is providing a constant pressure that is forcing water through a pipe (with constant internal diameter) that is open at the other end. The pipe is completely full of water, and for all practical purposes, the water is incompressible. The flow of the water, *Q* is in gallons per minute (gpm) and is to the right. Now, the flow is a constant throughout the pipeline. In other words, what is going into the pipe at the pump discharge point is equal to the flow going out the other end of the pipe. This is simply conservation of mass. The pipeline doesn't create or destroy water. So the flow *Q* (gpm) at any point along the pipeline will be the same (a constant) as long as the pipe is completely full, the liquid is incompressible and the pump is providing a constant pressure at the pump discharge point.

Figure 7-2

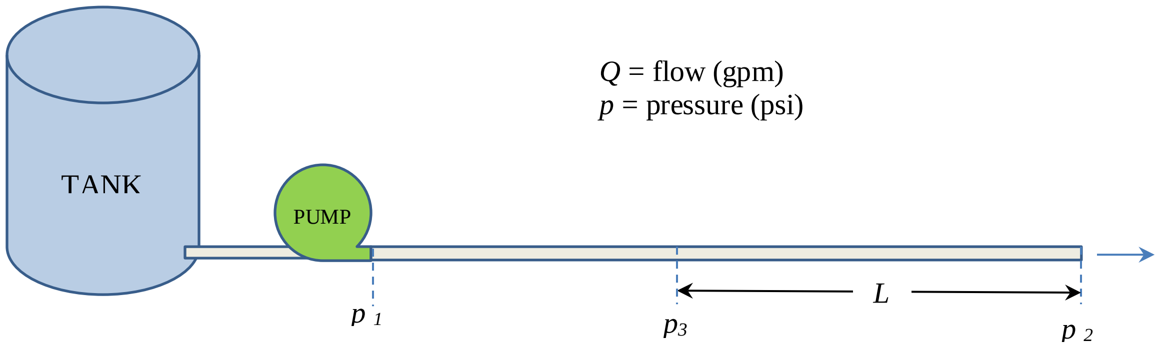


However, as seen in Figure 2, the pressure acts differently than the flow. The pressure (psi) is the force that is pushing the water down the pipeline. It's actually variable and decreases down the pipeline from the pump discharge point to the open end of the pipe. This almost looks as if the pressure is defying conservation law, but actually it isn't. The highest pressure in the pipeline is at the pump discharge point, p_1, and the lowest pressure is at the end of the pipeline, p_2. The reason the pressure varies (decreases) down the pipeline is because the pipe acts as a resistance to the flow. That is, the frictional force exerted by the interior pipe wall is causing an opposite force to the pressure provided by the pump. The greatest resistance is at the pump discharge point, because the entire length of the pipe is in front of the flow. In essence, at the pump discharge point, the pump has to overcome the resistance in the entire length of the pipeline. As the water progresses down the pipeline to the right however (at a constant flow), the resistance naturally decreases, because the pipe length (resistance) decreases in front of the flow. When the flow reaches the end of the pipe, the pipeline terminates and there is no more resistance.

Importantly, the pressure is proportional to the length of pipe. That is, the greater the length of pipe (in front of the flow) the greater the pressure required to maintain a constant flow.

This presents a rather interesting problem.

Figure 7-3



How do we calculate the pressure at any point in the pipeline? For example, if we take measurements of the flow and pressure at the end of the pipeline, how can we calculate the pressure p_3 at some point a length L from the end of the pipe?

Back in the late 1800's or early 1900's this problem was addressed by a waterworks engineer named Allen Hazen. Somehow, and nobody knows exactly how, he and another waterworks engineer named Gardner Stewart Williams came up with what is known as the Hazen-Williams Formula.

Basically it looks like this:

$$(Q/\mathrm{k})^{1.85} = (P_l)$$

Or: $$Q = \mathrm{k}\,(P_l)^{.54}$$

The P_l is the pressure loss per unit length of pipe (generally in psi/ft).

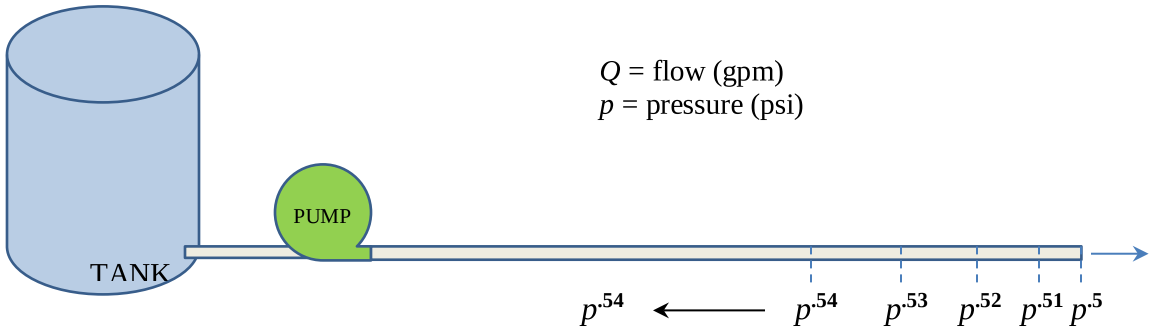
Here we see that the pressure varies exponentially to the 0.54 power, with respect to the length of pipe.

Now, there are times in our lives when we see something that is so intriguing that it has a lasting impression. An example of such a time is when I first encountered that exponent. The Hazen-Williams Formula is definitely <u>not</u> a fundamental motion law.

Why is the exponent .54 instead of .5 like every other mathematical relationship?!

Now it must be realized that when I first come across this equation, I had just started working as an engineer for a branch office of the largest, oldest (since 1835) and most prominent industrial fire protection laboratory in the world. Many years ago (I think in the 1930's) at their direction, the Hazen-Williams equation was incorporated to size piping in the design of fire protection sprinkler systems and has been used as such ever since. Since this research laboratory is owned by some of the largest industrial fire insurance companies in the world, they take fire protection system pipe sizing very seriously for good reason. The proprietors of the laboratory pay for buildings when they burn down. Subsequently, I was sure they must have researched this equation to determine its credibility. So, I contacted the laboratory home office and sure enough I was right. They had some literature on laboratory experiments they had performed on the Hazen-Williams Formula.

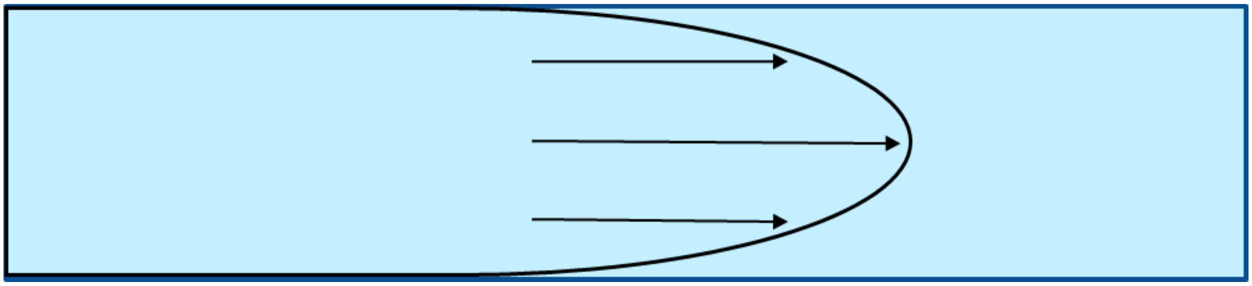
Figure 7-4



This is what happens. If we start at the end of the pipe (at the right) that is open to the atmosphere, the exponent is 0.5. This is a perfect parabolic variance at the end of the pipe and is in compliance with the flow and pressure relationship through an orifice ($Q = \mathrm{k}p^{.5}$) that we saw earlier. As we progress back into the pipe (toward the pump discharge point) however, the exponent progressively increases until it reaches 0.54 , then it tends to stay at 0.54 on back throughout the remaining portion of the pipeline. Now I believe this .54 exponent is somehow asymptotic. I think it's a non-terminating decimal (like π).

Anyway, the reason the exponent varies is because the pressure profile inside the pipe is parabolic. It forms a paraboloid with a parabolic profile with cross-section (inside the pipe) that looks like this:

Figure 7-5

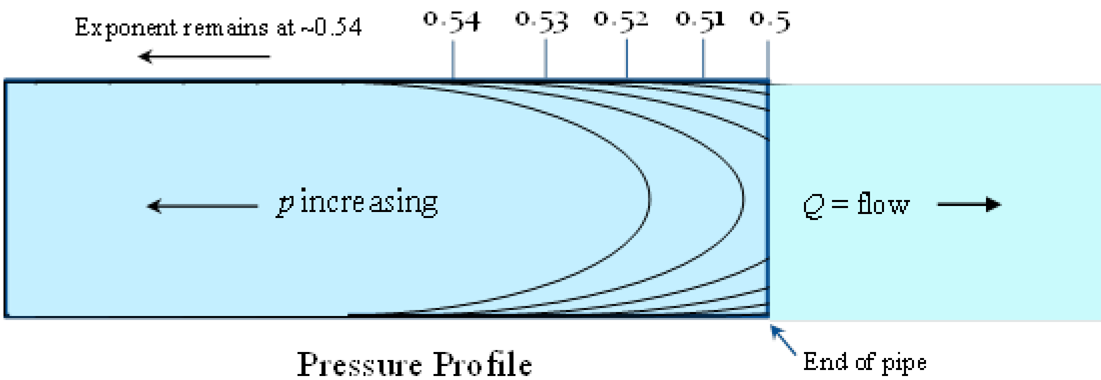


Pressure Profile (within a pipeline)

The arrows in Figure 7-5 represent the variance of the magnitude of the pressure inside the pipe. The frictional force at the pipe wall is acting as a retarding force to the flow, and the viscosity of the liquid causes the pressure profile to vary from the center at maximum pressure (least resistance) and decrease outward to the pipe wall (greatest resistance), forming a pressure paraboloid within the pipe. And the paraboloid is asymptotic to the pipe wall.

As the liquid approaches the end of the pipe, the paraboloid progressively truncates until it becomes nonexistent when the liquid leaves the end of the pipe, and there is no more retarding frictional force from the pipe wall. In essence, the nonlinear parabolic profile progressively becomes linear as the liquid travels to the right and leaves the end of the pipe. That's why the exponent increases relative to pipe length back from the end of the pipe, toward the pump discharge point. See Figure 7-6 following:

Figure 7-6



Now, you may be asking, "What is the significance of all this?" Well, looking at the pressure variance, we see an obvious anomaly of linear mathematics. What we have here is a variance with respect to a nonlinear (parabolic) system that increasingly approaches linearity toward the end of the pipe.

Significantly however, there are a couple of things happening here that are virtually unidentified and nonexistent in current concepts of science and mathematics.

First of all, as previously stated, there are only two types of variance in a linear continuum, either "variable base number with constant exponent" or "variable exponent with constant base number."

However, it is seen in the preceding fluid flow analyses that the base number, p_l and its exponent are varying simultaneously. In essence, as we go back into the pipeline from the end of the pipe (toward the pump discharge point) the pressure (base number) increases, and the exponent **also** increases.

Currently there is no analytical definition of this. That is, simultaneous variance of the base number and the exponent is virtually nonexistent in science and mathematics as we know it. This is one of the reasons why fluid dynamics is such a difficult and perplexing study.

To make matters worse, except for me, nobody seems to know about it.

Secondly, the only variables in the equation are the base number and the exponent. Everything else in the equation is constant. **Therefore, the base number and the exponent are apparently mathematically dependent.**

But in scientific derivation as we know it, there's no such thing as a mathematical relationship between a base number and its exponent.

Not until now.

Summary

The base number (p_l) varies because of the pipe resistance created by retarding frictional force at the pipe wall. The exponent varies because the parabolic variance (the pressure profile) truncates as the liquid approaches the end of the pipe and leaves the system. In essence, the continuum within the pipe starts out at the end of the pipe as linear and steadily transitions to a nonlinear parabolic profile as we progress back toward the pump discharge point.

Now, this variance (of both the base number and the exponent) is very similar to a nonlinear coordinate system that starts out at a reference point as an approached linear state and becomes progressively more nonlinear relative to distance from the reference point.

It now becomes apparent that a nonlinear coordinate system would be mathematically defined with both the base number and the exponent varying simultaneously, and also the base number and the exponent would thus be mathematically dependent (as one varies, so does the other).

This would occur as a transformation from an approached liner state to a fully nonlinear state.

Needless to say, this is a rather complicated scenario.

More importantly however, it opens the door to an entirely unknown concept of mathematics.

Chapter 8

Mathematics of the Nonlinear Field – Part I

Prelude

Now we consider this: "simultaneous variable base and variable exponent." Assume a single equation in which the base-number and the exponent are both variable. The reasoning of this follows:

First we consider a length, from some fixed reference point, as variable relative to a continuum (as in the exponential Graph 1A). However, as the base-number (length) varies from a reference point held fixed, there is a corresponding variance of the space continuum itself (expressed by its variable exponent). Thus, a "length of space" cannot be linear if the coordinate system itself (space continuum) is not linear. For example, as the length (base-number) increases from a reference point, the exponent also varies (increases or decreases). In essence, if the Universe is nonlinear, everything within it would be nonlinear as well. In the definition of a nonlinear coordinate system, here again it obviously follows that there would be a mathematical relationship between the base-number and the exponent.

The Base Dependent Exponential

We may say, for an equation to define the curvature of the space continuum, the exponent is a function of the base number.

To show the derivation of such an equation, we will assume a point in space exists at a slope relative to the continuum. Integral calculus is used to determine the equation that defines this slope.

[Previously the differential calculus was shown to define the slope of a curve. The slope equation is called a "derivative." To "integrate" is to "find a function whose derivative is given" (differentiation in reverse). The resulting equation is called an "integral."[3]]

Another nonlinear variance is shown with an "inverse" such as the Inverse Square Law that Newton used to define the relationship between distance (from a mass) and the force of gravity. The *perspective variance* can also be shown as an inverse variance such as the logarithm graph shown in Graph 2B. The *perspective variance* is the phenomenon that standard units vary inversely (decrease) with distance relative to a fixed reference point. [The hypothetical result of the perspective variance is what artists refer to as the "vanishing point."]

The integral of the simple inverse is as follows:

$$\int_1^x \frac{1}{x}\,dx = \ln x$$

Again we see a variable exponent (or logarithm variance). This equation is the mathematical definition of the "natural logarithm." Integral calculus however, also defines the area under a curve. Thus, the natural logarithm of x is equal to the area under the curve subscribed by $1/x$ from $x = 1$ to $x =$ infinity. The base number of the natural logarithm is called the Euler Number ($e = 2.71828\ldots$) and is a non-terminating decimal. The reason it's a non-terminating decimal is because no matter how large x becomes, the equation $1/x$ itself can never equal zero. It can get very close, but it can't equal zero. The graph of $1/x$ is asymptotic to the x-axis. That is, as x gets larger, the curve approaches linearity along the x-axis.

At any rate, the natural logarithm defines a curve similar to that expressed in Graph 2B. The increments become progressively smaller relative to length from a reference point held fixed in a nonlinear coordinate system.

It's the next integral (the second integral of 1/*x*) that shows an anomaly that is not used in any form of mathematics or science at this time and leads to the *Base Dependent Exponential* concept:

$$\int_1^x \ln x \, dx = x \ln x - x + 1$$

The first term on the right side of the equation can be written as follows:

$$x \ln x = \ln x^x$$

Thus, as a simplification:

$$\int_1^{x^x} \frac{1}{x} \, dx = \ln x^x$$

And:

$$e^{\ln x^x} = \boldsymbol{x^x}$$

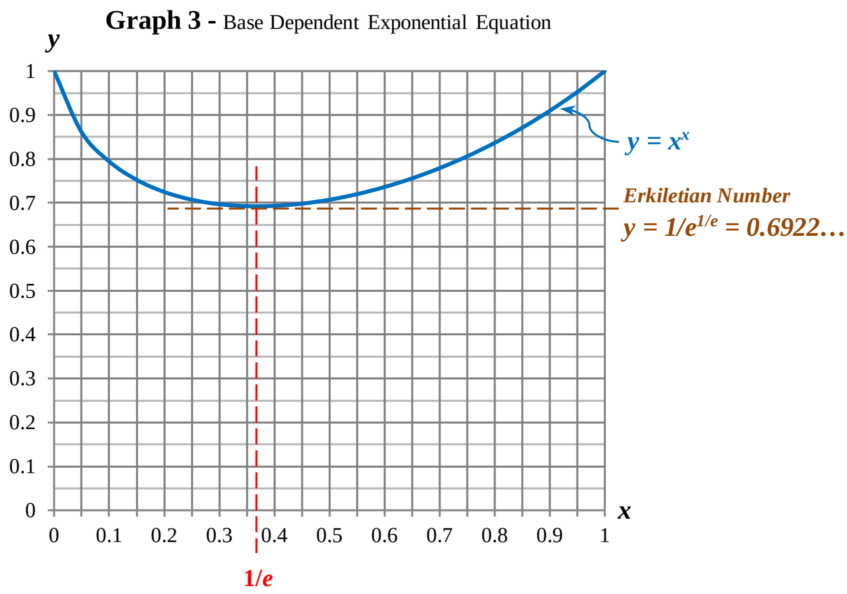
The term on the right is the Base Dependent Exponential Equation (so named by this author). In essence, the base number and the exponent are equal and thus are obviously dependent variables.

This is the fundamental equation of nonlinear mathematics, the basis of the analytical definition of nonlinear field theory.

[Side Note: In 1980, when I first discovered the base dependent exponential, I called a Professor Emeritus Mathematician (retired professor of mathematics) in my home town. I asked him, "How would you differentiate *x* to the *x* power?" He thought about it for a moment and said, "That equation doesn't make any sense." I suppose it should be discouraging to me that a prominent mathematician would tell me my discovery didn't make any sense. In fact however, it actually had the opposite effect, because it indicated to me that I was on to something very different than the norm. So not knowing any better, I went on investigating the equation anyway.

In 1980 we didn't have graphing calculators. I did however have a TI-59 advanced calculator. It was programmable, but it didn't do graphing, so I plotted (on graph paper) the *x*, *y* coordinates of the base dependent exponential between $x = 0$ and $x = 1$ (where $y = x^x = 0^0, 0.1^{0.1}, 0.2^{0.2}......1^1$). Plotting the curve by hand worked out for the most part. The only problem was that I couldn't figure out how to find the precise coordinates of the low point on the curve. I could get close. In essence, I could tell from my hand drawn plot that the low point was somewhere between $x = 0.3$ and $x = 0.4$. So, I programmed the TI-59 to iterate the equation back and forth between increasing and decreasing results (displaying the value for *x*) and put a stop on the program at an *x* value of six decimal points. Now, although the TI-59 was a remarkable little machine back then, it was very slow compared to today's programmable calculators. So I started the iteration program running and went off to do something else. I came back a few minutes later, and the program had stopped at $x = 0.367879....$ Well, at that time I didn't see anything remotely significant about that value, but just for fun, I hit the invert button, and this is what came up: 2.71828... I had just derived the inverse of the base number of the natural logarithm. At the low point on the curve, *x* is equal to the inverse of the Euler Number, the inverse of the universal constant of mathematics.]

Graph 3 shows the equation $y = x^x$ plotted from x = 0 to x = 1:



Here we will follow the supposition that the Universe is finite. So the equation is only plotted between zero and one. Furthermore, zero and one are only used as reference points or starting points. The Universe cannot go to zero nor can it be greater than one, because either case would violate conservation law. In line with conservation law, we have simply set the Universe equal to one rather than infinity.

The Graph 3 indicates some rather interesting characteristics as follows:

As the linear x varies toward one, the equation varies toward one. Also, as x varies toward zero, the equation again varies toward one. No matter which way x varies, the equation x^x can only vary toward one. This certainly complies with conservation law, unlike conventional mathematical concepts with so-called limits of zero and infinity.

As explained in the preceding side note, the low point on the curve is particularly significant. At the low point, x is equal to $1/e$ and the curve becomes parallel and "linear" (as tangent to the curve) with respect to the x-axis. We define this point as "the point of linearity" with respect to the x-axis. Thus at linearity, x is equal to the inverse of the base number of the natural logarithm and is a non-terminating decimal.*

This leads to the following theorem (the Fifth Theorem in the reference book: *Premise Theories of the Micro Macro Correlation*):

Fifth Theorem:

The nonlinear system does not transform to a linear state. The result of such transformation is a nonterminating decimal.

In other words, we have either a linear system or a nonlinear system. We can't have both. The nonlinear system may *approach* linearity, but cannot actually attain it; because linearity is defined by a non-terminating decimal. By this hypothesis, the linear coordinate system simply doesn't exist. **Nonlinearity is a conservation law of physics.** The Universe (and everything within it) is nonlinear.

This is the reason that "mass cannot displace mass." In accordance with conservation law, two masses can get very close to each other, but one mass cannot displace the other. Here we may say that true "<u>congruence</u>" between masses cannot be attained, because attempted "displacement" is asymptotic (a nonterminating decimal). Here again, we can approach linearity, but we can't quite get there.

Another example of the Fifth Theorem is π, the ratio of the circumference of a circle to its diameter. It's a nonterminating decimal, because its derivation attempts to use a linear measurement (the diameter) to measure a nonlinear locus of points (the circumference).

Two other points on the plot in Graph 3 are also significant: when $x = 0$ and when $x = 1$.

When x is equal to zero there is an interesting anomaly I have named the *linear contradiction*:

> All simple exponential equations are equal to zero, if the <u>base number</u> is equal to zero ($0^x = 0$).
> All simple exponential equations are equal to one, if the <u>exponent</u> is equal to zero ($x^0 = 1$).
>
> So, what is x^x when x is equal to zero, one or zero?

If we assume a continuous curve, as x approaches zero the equation x^x approaches one, not zero. Also, when x reaches zero, the equation simply terminates. The equation x^x does not become asymptotic as might be expected with an infinite Universe, nor does it become negative. It just stops.

In reality x cannot equal zero anyway, because that would violate conservation law. Here we see that zero and one equate. A similar example is a circle with circumference equal to one unit. If we start at any reference point on the circumference that we designate as zero and travel around the circumference one unit, we have returned to zero. So, in essence, zero and one equate.

The next significant point is when x is equal to one. Here the equation x^x is equal to one, and its <u>slope</u> is also equal to one. When x equals one, the equation curve reaches (actually approaches) 45 degrees with respect to the vertical and horizontal axes. At this point the Universe approaches linearity with respect to both the x and y axes.

At $x = 1$ is where the Universe starts <u>and</u> ends. This is <u>any</u> point in the Universe.

> *[Here is an interesting thought pertaining to the velocity of light and the base number of the natural logarithm (the Euler Number). As previously shown with the Lorentz Transformation, the velocity of light is an absolute constant within a <u>linear</u> coordinate system. This indicates that the velocity of light is actually a nonterminating decimal and is thus asymptotic to a linear state. The point of linearity along the x-axis (when $x = 1/e$) of the curve of x^x shown in Graph 3 is also a nonterminating decimal. Has it ever occurred to anyone that the universal constant of physics (the velocity of light) and the universal constant of mathematics (the Euler Number) are somehow related? Could it be that the two non-differentiable constants, one in physics and the other in mathematics, are in fact the same thing? It seems to me that could make for a very interesting research study.]

Chapter 9
Slope Derivation

Prelude

From analytical evidence, as well as empirical evidence, the Universe certainly appears to be nonlinear. Therefore, the concept of the slope of a curve is imperative. That is, the nonlinear variance of the continuum becomes clear only if slope derivation is understood. It seems to me that big-bang theorists don't seem to understand what the slope of a curve is. So, I'm including the following to clarify this.

Slope Definition

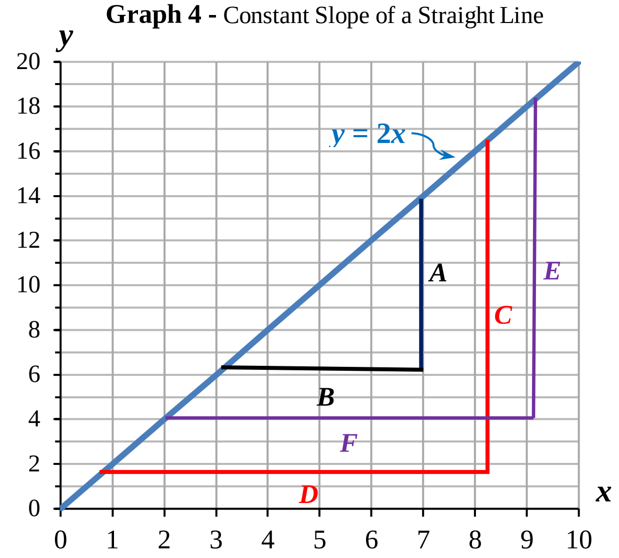
The slope is defined as the "rise over the run" at a particular point on a curvature relative to a reference point (origin) or space continuum held fixed. Importantly, a straight line has a constant slope. This is shown in the following Graph 4, with similar triangles representing a positive slope.

The straight line subscribed in the graph is $y = 2x$. Here we see that for any right triangle drawn along the line $y = 2x$ as shown, the ratio of the "rise over the run" (slope) is a constant. In this case the slope is always equal to 2.

This is verified with similar triangles as shown following:

$$\frac{y}{x} = \frac{A}{B} = \frac{C}{D} = \frac{E}{F} = 2$$

Graph 4 - Constant Slope of a Straight Line



Now, if the y-axis in Graph 4 represents the recession velocity of a galaxy and the *x*-axis represents the respective distance to the galaxy, then the Hubble Constant would be the slope of the subscribed curve. In essence, if the Hubble Constant is actually a constant, then the ratio (rise over the run) of the recession velocity, *v* to the distance, *D* will subscribe a straight line, as Hubble believed.

That's why it's called the Hubble Constant, because it's the slope of a straight line.

Now, the slope of a curvature is a bit more complicated than the slope of a straight line however and is not as easily defined. This is because the slope of a curved line varies with respect to distance. Therefore, the slope of a curve is defined by a mathematical equation (slope equation) derived from Newtonian differential calculus.

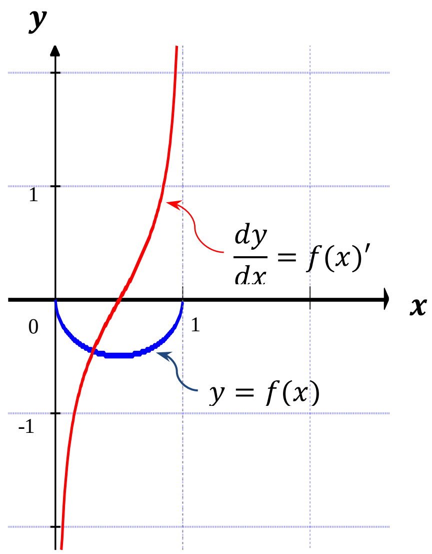
To illustrate this we will use the following equation of a half circle with radius equal to 0.5:

$$y = f(x) = -\sqrt{-x(x-1)}$$

And, we *differentiate* the equation of the circle, to find the equation of the slope of the circle:

$$\frac{dy}{dx} = f(x)' = \frac{2x-1}{2\sqrt{-x(x-1)}}$$

Graph 5 - Half Circle with Superimposed Slope Curve



In the preceding graph, the plot of the slope equation is shown with the red line and is subscribed on top of the equation of the circle, which is shown with the blue line. There are two very important concerns about the curve subscribed by the slope equation of a circle:

1. The slope equation (*dy/dx*) is *asymptotic* to the line *x* = 0 and also to the line *x* = 1. Here we see that the slope curve can only *approach* zero or one but can never actually equal zero or one. An asymptote is a graphical representation of a *nonterminating decimal.*

2. The slope equation approaches linearity (approaches a vertical straight line) as *x* approaches zero and also as *x* approaches one. **Most importantly, the slope equation starts out (from *x* = ~ 0) very close to linear, however is actually concave downward, and at the center of the circle the slope curve changes direction to concave upward and again approaches linearity as *x* approaches one.**

Excluding the discovery of the Base Dependent Exponential, the preceding derivations are the most important discoveries shown in this thesis. Specifically, the slope equation of a circle follows a similar variance to the empirical plot of the variance of the Hubble Constant shown in an astronomical experiment performed in 1978.

Chapter 10

Mathematics of the Nonlinear Field – Part II

Prelude

Is there reliable evidence that the Base Dependent Exponential Equation defines the reality of the space continuum? The answer is yes, if the mathematics fits the observed data.

Therefore, in order for the theories presented here to be credible, it must be shown that the *analytical derivation* complies with *empirical evidence*.

To show this, we will look at observed empirical data, calculate the theoretical data (using Base Dependent Exponential Mathematics) and simply compare the two. If there is the appearance of a correlation between them, we may conclude that Base Dependent Exponential Mathematics likely complies with Scientific Method and is thus a plausible mathematical supposition.

The Variable Slope of the Continuum and the Hubble Constant

There has been much contention among cosmologists as to the exact value of the Hubble Constant. There is a very good reason for this. The Hubble Constant isn't a constant. This will be shown analytically using calculations incorporating Base Dependent Exponential Mathematics. Also, the empirical data shows the Hubble Constant to be variable as well. Furthermore, both the analytical and the empirical data show the Hubble Constant to approach a linear state at relatively short distances. That's why Edwin Hubble thought it was a constant. In essence, he couldn't see vary far into the Universe, and the slope is close to constant (linear) for relatively short distances.
.
Big Bang theorists accept that the Hubble Constant is not constant but have an archaic way of explaining it. They have explained away this nonlinear character of the Hubble Constant by claiming that the Universe is not only expanding, it's accelerating due to some sort of "dark energy." As stated previously however, there is no correlation of a celestial body's distance with its acceleration any more than there is with its velocity. So now we have some mysterious dark energy that's causing "recession acceleration."

"Old habits die hard."

There is a much more viable scenario here. In truth, as explained following, the Hubble Constant isn't constant, because the continuum is not linear. The so-called Hubble Constant was believed to be the slope of a straight line; however it actually represents a variable slope, the slope of a curve.

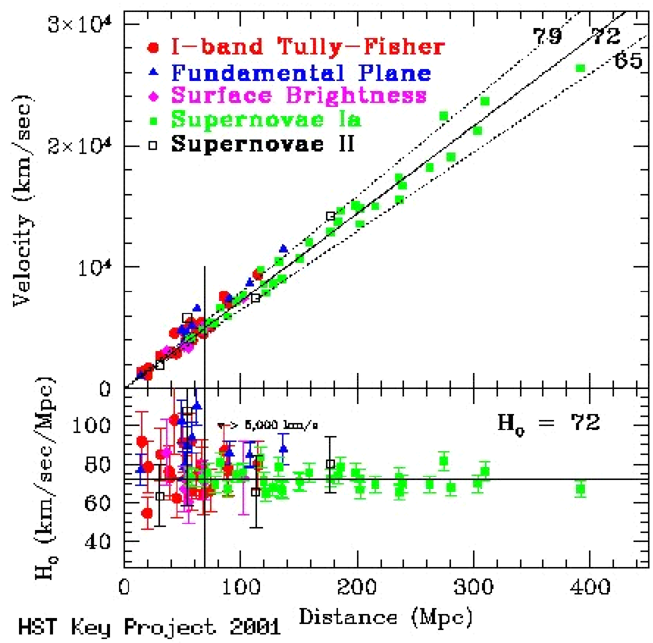
As explained in the preceding chapter, if the Hubble Constant is in fact a "constant," the Universe must be linear as the Big Bang theorists contend, because the slope of a straight line is a constant. So, if the Hubble Constant does not vary with distance, there is no skew or nonlinear character to the space continuum. This has been found not to be the case empirically (as shown in Graph 7 following).

Nevertheless, it was previously shown that there is no credible mathematical relationship between a celestial body's recession velocity (and also recession acceleration) and its distance. The relationship is purely empirical with no analytical definition. Therefore, we still have no viable solution. However, it was also shown (and well known since the time of Newton) that the slope of a continuous curve is directly proportional to distance.

Thus, since the Hubble Constant is actually a variable, this strongly indicates that there is a nonlinear skew to the space continuum.

Graph 6 is a representation of the plot of the observed Hubble Constant up to a distance of about 417 million parsecs (1.36 billion light years) and the corresponding recession velocity up to about 30,000 km/sec. It is seen that the slope H_o, is equal to about 72 km/sec/million parsecs (about 22 km/sec/million light years). This value for the Hubble Constant is considered acceptable by most cosmologists today.

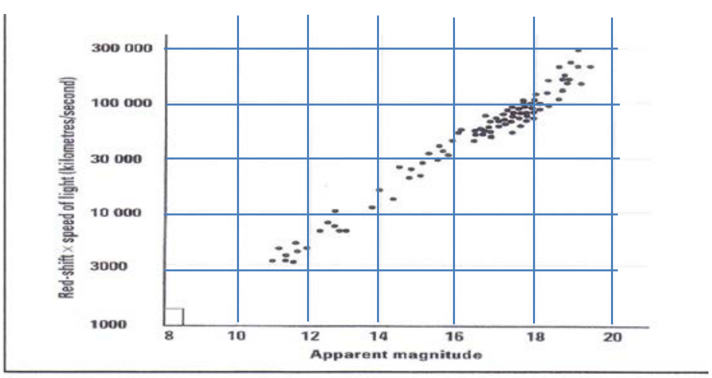
Graph 6 – Recession Velocity vs. Distance



The empirical data represented in Graph 6 was taken from astronomical data collected with the Hubble Telescope and shown in HST Key Project 2001. The graph can be found on the internet. The Hubble Constant is between 67 and 79 (about 72 km/sec/Mpc average). Take a look at the lower plot shown in Graph 6. The plot seems to curve concave downward as does the slope equation of a circle as shown in Graph 5. The data points are a bit too erratic to tell for sure. You can be the judge.

Graph 7 following shows the empirical data of the recession velocity plotted versus the apparent magnitude of Supernova Type 1a. This curve is plotted up to much greater distances and greater recession velocities (up to the velocity of light) than the plot shown in Graph 6 preceding.

Graph 7 – Recession Velocity vs. Apparent Magnitude



The empirical data shown in Graph 7 is taken from Astronomical Journal, 1978 and has been published in *The Big Bang* by Joseph Silk and also in *Einstein's Mirror* by Tony Hey and Patrick Walters. [I think the data was compiled at the Mount Palomar Observatory in 1978.]

Although here again the data points are somewhat erratic, this plot does not appear to be very linear at all. This is very noticeable when the apparent magnitude is greater than about 16 and is especially noticeable above 18. Here the plot obviously becomes concave upward. This is where the Big Bang theorists found out that the Hubble Constant isn't constant. The upward swing at the latter portion of the plot gave them the idea that the Universe is accelerating.

Unfortunately they were mistaken. Evidently they forgot to look at the rest of the curve.

In truth, the curve starts out as very close to linear (as Hubble thought) but is actually concave downward, then changes direction and becomes concave upward. This plot appears to be very comparable to the curve subscribed by the slope of a circle as shown in Graph 5.

The plots in both Graphs 6 and 7 preceding will be compared to analytical data plotted from calculations. This will show that there is a correlation between the results of Base Dependent Exponential calculations (or analytical data) and the empirical data shown in Graphs 6 and 7.

At any rate, the Base Dependent Exponential Equation plotted in Graph 3 does not conform to the preceding empirical graphs of the Hubble Constant (or maybe we should say "the Hubble Variable"), so the equation must be rewritten such that it will correlate to the empirical data. This requires a mathematical rearranging of the equation, so that the reference point for the analytical derivation is placed at the origin of a conventional graph.

Looking back at Graph 3 (the plot of x^x), it is seen that the curve approaches a 45 degree angle when $x = 1$ at point (1, 1). This point ($x = 1$) is chosen as our origin because the curve approaches linearity with respect to both axes at that point. However, in order to conform to the plot of the empirical data (Graphs 6 & 7) we must place this point (1, 1) at the origin of (0, 0). To do this, first the equation x^x is reversed (as a mirror image) by simply replacing x with the quantity $(1 - x)$. Then 1 is subtracted from the equation to lower the starting point of the curve to the origin (0, 0). Here the new plot will cross the origin (0, 0) at a 45 degree angle into the negative of the vertical axis. Since x and y (y as the vertical axis) are equal when the curve is at a 45 degree angle, x is added to the equation to put the plot of the curve into the positive x, y quadrant. This essentially makes the plot of the base dependent exponential equation correspond with the plots of the empirical data shown in Graphs 6 and 7. In other words, the origin in the analytical graph now corresponds to the origin in the empirical graph.

This will allow a comparison of analytical data to that of empirical data.

The resulting equation of the curvature of the continuum looks like this:

$$y = (1 - x)^{(1-x)} - 1 + x \qquad \text{(Continuum Curve Formula)}$$

Now we differentiate the equation to find the slope.

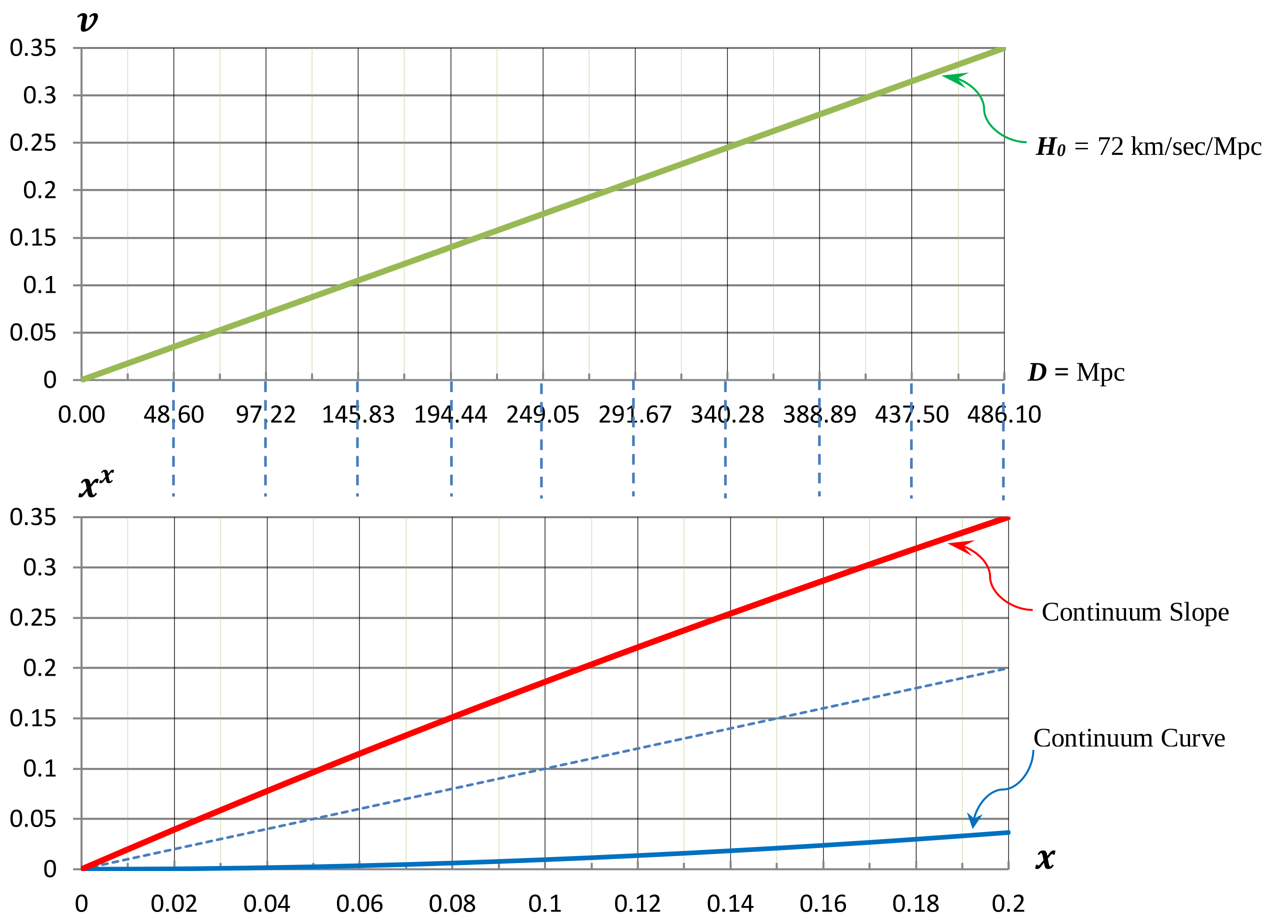
$$\frac{dy}{dx} = 1 - (1 - x)^{(1-x)}[\ln(1 - x) + 1] \qquad \text{(Continuum Slope Formula)}$$

The Continuum Curve Formula defines the curvature of the space continuum, and the Continuum Slope Formula obviously defines its slope. **The Continuum Slope Formula is the actual cause of the red-shift and replaces the Hubble Constant**.

The Continuum Slope Equation does not subscribe a constant (straight line). Well it's not exactly a constant, although it's close to constant at relatively short distances. As stated previously, the continuum approaches linearity at any point in the Universe, so the continuum slope formula approaches a straight line at relatively short distances from the observer, and therefore at short distances, it compares well to a constant slope as does the Hubble Constant in Graph 6.

The comparison between Graph 6 and the calculated data is shown in Graph 8 following.

Graph 8 – Short Distance Empirical and Analytical Comparison

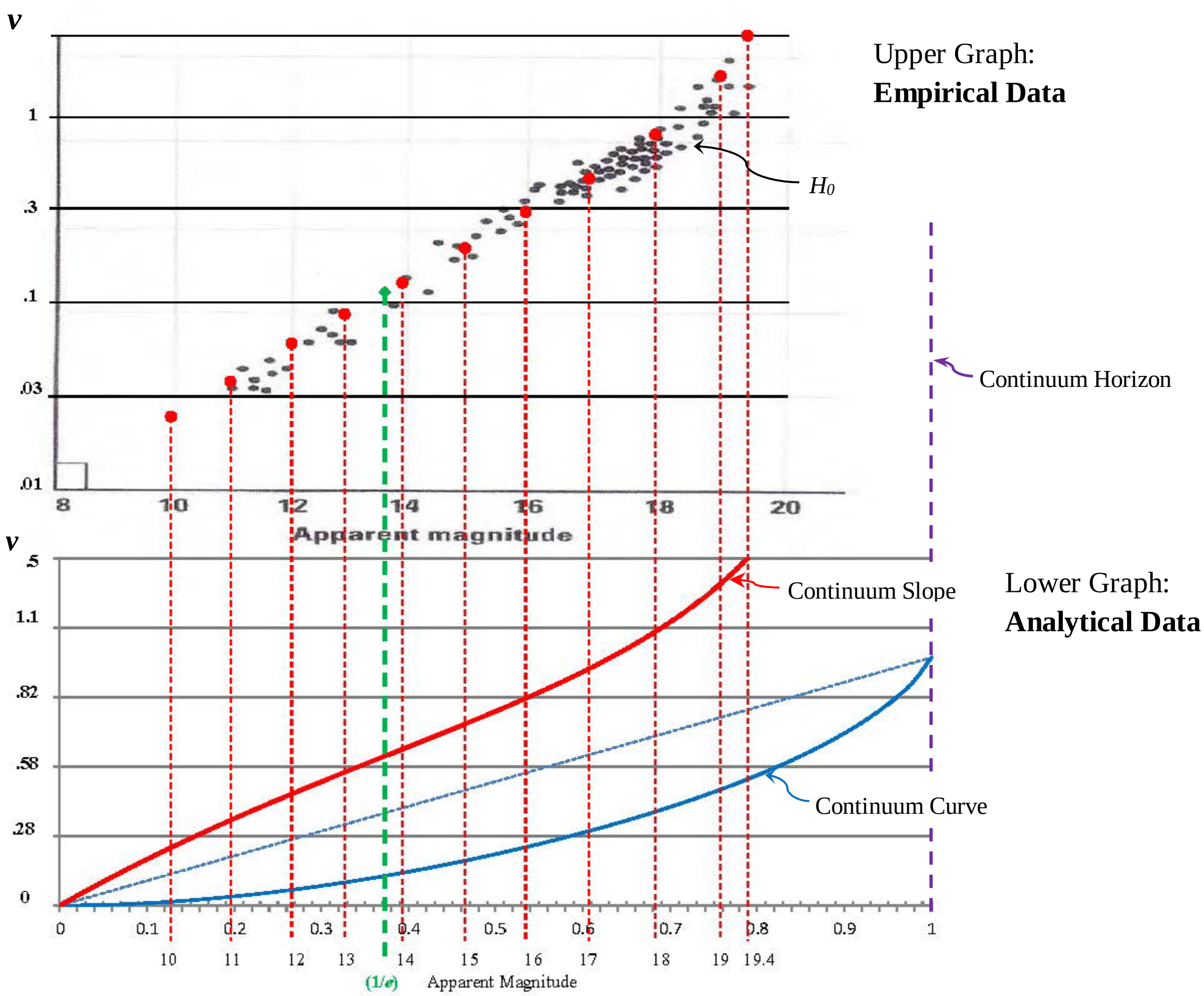


Graph 8 shows the empirical data in the upper graph with the Hubble Constant equal to 72 km/sec/Mpc. The calculated (analytical) data is shown in the lower graph. The increments on the *x*-axis are decimal portions of the Universe.* As seen, the curve of the Continuum Slope Formula (shown in red) is very close to linear and compares closely to the Hubble Constant of 72 for relatively short distances (up to 486 Mpc). However, the Continuum Slope, shown in the lower graph, is close to linear but is actually slightly concave downward.

*[At the time of this writing, the length of the Universe was believed to be about 13.8 billion LY which would be about 4.23 billion parsec. That's based on the idea that it's been 13.8 billion years since the Big Bang supposedly occurred. However, assuming the figure of about 486.1 Mpc shown in the upper graph is a valid length, it should correlate to about 20% (0.2) of the Universe as shown in the lower graph. If the calculated data is correct, the size (radius) of the Universe is actually only about 2.43 billion parsec or 7.9 Billion LY.]

The next graph compares the empirical data with calculated data of a much greater portion of the Universe. This is shown in Graph 9 following. The two graphs don't line up perfectly, because the axis showing the empirical data of the so-called recession velocity is shown as some sort of exponential variance. Then again, the vertical axis isn't velocity anyway, because recession velocity doesn't exist.

Graph 9 – Empirical and Analytical Data Comparison



Graph 9 is a comparison of the empirical data obtained from actual observation at the Mount Palomar Observatory (shown in the upper graph) and calculated data derived from Base Dependent Exponential Mathematics (shown in the lower graph). Here the lower plot of the Continuum Slope Curve is superimposed on the upper plot of the empirical curvature of H_o. The conclusion presented here is that the empirical data appears to match the calculated data to some extent.

Most importantly, both the empirical data and the analytical data subscribe curves that start close to linear (as Hubble believed) however are actually concave downward and change direction (at an apparent magnitude of about 16 for the empirical data and about 14 for the calculated data) and then become concave upward.

Most importantly, both curves subscribe the slope of a continuous curvature analogous to the slope equation of a circle as shown previously in Graph 5.

Summary

The preceding suggests that the vertical axis represents the slope of a curvature as shown in the analytical (calculated) data rather than velocity (or acceleration) as shown in the empirical data. The conclusion is that the so-called Hubble Constant is actually a representation of the slope of the curvature of the continuum and is not a ratio of velocity to distance as expressed by Hubble's Law.

The vertical purple dotted line shown at x equals one in Graph 9, is called the Continuum Horizon. The empirical plot reaches a point where the recession velocity would be equal to the velocity of light. However, the recession velocity does not equal the velocity of light, because there is no such thing as recession velocity. In reality, the Continuum Slope Formula is asymptotic with the Continuum Horizon.

Whether there is anything beyond the Continuum Horizon is debatable. On the other hand, the Continuum Curve offers a clue. Remember from the original graph of the Base Dependent Exponential Equation (Graph 3), the equation terminates when x is equal to zero. Since the equation was turned around, the equation now terminates when x is equal to one. It seems that this is a good indication that nothing exists past the Continuum Horizon.

However, there is another more plausible possibility. Assuming we have established that the Universe is nonlinear, it seems reasonable that it's a "closed system" and returns upon itself. Thus, when the plot of the Continuum Curve Formula stops at the Continuum Horizon, perhaps it has returned to its original starting point. Again, looking back at the original plot of the Base Dependent Exponential Equation shown in Graph 3, it is seen that (on the vertical axis) the equation goes from one when x is equal to one and back to one when x is equal to zero. In essence, it simply returns to its starting point. The turning point is when x is equal to $1/e$. The Continuum Slope curve is positive and concave downward from $x = 0$ to $x = 1/e$. From $x = 1/e$ onward, the curve is positive and concave upward.

That is, at $x = 1/e$ the slope changes direction just as the slope curve of a circle changes direction at the center of the circle.

This concept indicates the Universe is a closed system. It ends where it begins, as does the circumference of a circle.

Chapter 11
Supplements

3rd Supplement

Bruce Edward Erkiletian's
Premise Theories of the Micro Macro Correlation

Prelude

There is one more contention of the Big Bang that has not been addressed in this thesis. This of course is the so called Cosmic Microwave Background Radiation (CMB). The Big Bang theorists are convinced that this verifies that the Big Bang occurred.

In fact, the existence of the CMB has been known for quite some time and has recently been very accurately measured. The CMB is a relatively long wave radiation that is emanating from the cosmos and appears to be coming from all directions.

At any point on the spectrum, light waves propagate at a constant velocity by the relationship λf = 300,000,000 m/sec, where λ is the wavelength in meters and f is the frequency in Hz (cycles per sec). The CMB is about 1.604×10^{11} Hz with wavelength of approximately 1.87×10^{-3} m. This is in the microwave range of the electromagnetic spectrum and the wavelength is relatively long compared to that of visible light. In fact, the CMB wavelength is some 2,850 to 4,560 times greater than that of the line spectra of hydrogen within the visible range.

Also, the wavelength at any point on the electromagnetic spectrum can be related to temperature of a black body. A black body radiates energy equal to the energy it receives. The black body radiation emanates at the peak intensity of a light source frequency, f_{max}. This can be calculated with a form of Wien's Distribution Law as follows:

$$T = \frac{hf_{max}}{\alpha k} \text{ (K)}$$

Where:

h = Plank's Constant = $6.6260755 \times 10^{-34}$ J-sec

k = Boltzmann's Constant = 1.389658×10^{-23} J/K

α = Maximization Constant = 2.821439

So, the CMB with a frequency, f_{max} of 1.604×10^{11} Hz, has a black body temperature of about 2.73 K.

The idea is this: when the Universe exploded, it generated a lot of heat and consequently very high temperature. However, it has expanded to a point that the temperature has dropped to 2.73 K. So the theory goes. According to Big Bang theorists this CMB temperature is the remnants of the Big Bang and is "irrefutable" evidence that the Big Bang occurred [4].

[Again, I must say that I find it a little absurd when a so-called prominent scientist attempts to slam the door on any viable alternative to conventional theory. I like to think that we have learned something since the suppression of the Copernican heliocentric solar system and the inquisition of Galileo. It seems "the players have changed but the game is the same."]

The CMB as a Nonlinear Definition

There is another concept, taken from classical relativity that works very well with the nonlinear system and explains the CMB in a very different way.

Velocity is a relativistic entity and in accordance with the Lorentz-Fitzgerald contraction, the Universe isn't very large relative to a light beam. In fact, its size approaches zero. This of course isn't true relative to you and me but it is to a light beam. For example, relative to the earth, it takes about eight minutes for a light beam to travel some 150 million km from the sun to the earth. Relative to the light beam itself however, this distance is infinitesimal.

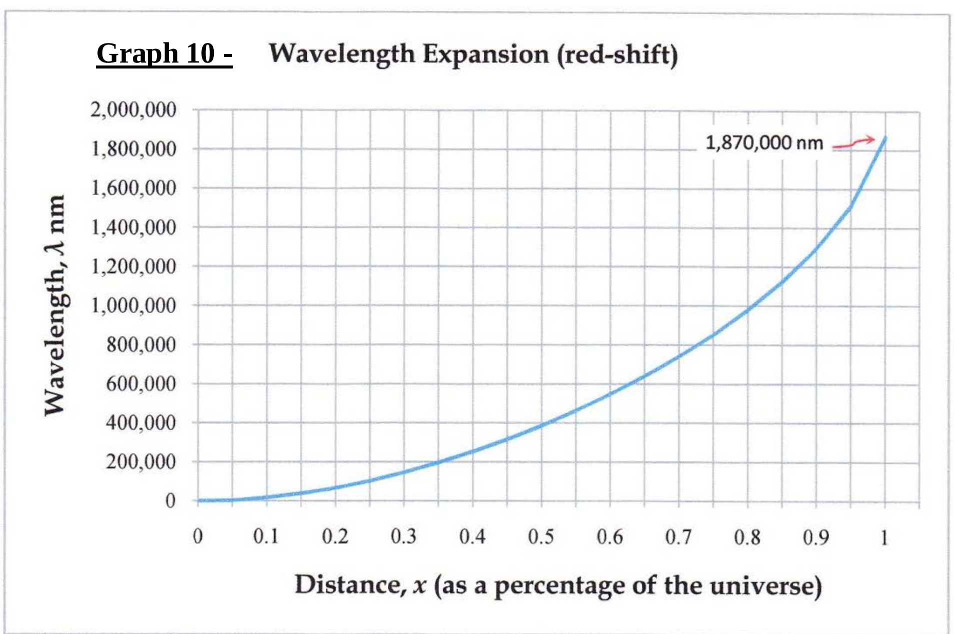
So we may assume that a light source, such as the sun, projects light out into the Universe in all directions and the light reaches the extremity of the Universe very quickly (relative to the light beams). This extremity we have defined as the Continuum Horizon when x is equal to one. So, when the sun's light waves have reached this extremity, they have expanded (red shifted relative to the sun) to maximum in compliance with the nonlinear character of the space continuum. Looking back at Graph 3a, the Continuum Horizon is as far as the light can go. So what happens to it at that point?

It has returned to its starting point (the sun) with a couple of differences. The wavelength has expanded (red shifted) into the microwave range to 1.87×10^{-3} m. However, not all of the light returns, because some of it has dissipated (has been absorbed by other masses in the Universe).

The wavelength variance relative to distance can be mathematically defined as follows:

$$\lambda = 1.87 \text{ x } 10^{-3}((1-x)^{(1-x)} - 1 + x))\text{m}$$

Graphically it looks like this, [wavelength in nanometers (10^{-9} m = 1 nm)]:



Graph 5 shows the effect of the continuum skew on the wavelength of light. The wavelength reaches a maximum length and maximum intensity (frequency) at the continuum horizon (when $x = 1$, $\lambda = 1.87 \times 10^{-3}$ m). Furthermore, when x equals one it is concurrent with x equals zero. Zero and one (on the x-axis) are in essence the same point.

The CMB is the maximum elongation of the hydrogen spectrum. This occurs at the extremity of the continuum relative to a light source. The CMB would be the "shifted" hydrogen spectrum since hydrogen is the most prevalent light source in the Universe. The extremity is at the same point as the starting point of a light source, and thus the CMB appears to emanate from all directions.

This of course assumes the Universe must be "closed," and thus returns upon itself (as does the circumference of a circle or the surface of a sphere). By this argument the Universe is finite and as indicated previously, concurs with the conservation laws of physics. If the Universe is an "open" system it does not. Neither *infinity*, nor its inverse *creation*, can be derived with scientific or mathematical method, because neither can be defined with conservation law. Philosophically it may be arguable whether infinity and creation are viable concepts, but science by definition requires analytical and empirical proof. In short, if the system is open, there is no scientific solution.

4th Supplement

Bruce Edward Erkiletian's
Premise Theories of the Micro Macro Correlation

Exclusion of the Linear Axiom

[Following is a condensed version of my original derivation of the *base dependent exponential equation* developed in 1980 and copyrighted in the original manuscript in 1988. This condensed version (with some minor differences) is also included in the published book as Appendix 1, *Initial Postulate.*]

This is a study of the simple exponential variance. It was devised to show the validity of the combination of variable base and variable exponent mathematics through eliminating the concept of constant base or constant exponent equations. In essence, this is a process of elimination and is more cumbersome than the integral calculus derivation of the *base dependent exponential equation* shown in the 2nd Supplement. However, it shows some significant discrepancies of linear mathematics.

Essentially, it shows the linear derivations used in conventional mathematics to be incapable of defining the true nonlinear nature of the Universe. Here however, it is reasonable that linear mathematics would be predominant (in fact all-inclusive at present) in scientific derivation. This is because our coordinate system is so close to linear in our immediate vicinity that its true nonlinear nature is undetectable.

Another interesting concept, shown in this analysis, is the inability of the *base dependent exponential* to go to zero. There appears a discrepancy in the linear equation forms, which can be considered violations of the conservation laws of physics.

We thus define nonlinear variance within a linear coordinate system as *linear mathematics*. The linear mathematics is further defined as either holding the exponent constant and varying the base number *or* holding the base number constant and varying the exponent (logarithm). Again, it is emphasized that, although both math structures define nonlinear variance, the variance is in relationship to a linear coordinate system. Vitally, linear mathematics does *not* define a nonlinear coordinate system.

The simple exponential is assumed with ***x*** and ***y*** each as *potential* variables. The ***x*** is the **base** number and the ***y*** is the **exponent**.

$$x^y$$

This equation we shall call the **result.**

In addition, boundary conditions are assumed. In this case, the Universe is set equal to one. Therefore, the boundary conditions are one and zero.

$$x^y;\ 0 \le x, y \le 1$$

Figure 4 shows the result $\boldsymbol{x^y}$**,** when the equation variable reaches boundary conditions of zero and one. For example, if the base number ***x*** is the variable, $\boldsymbol{x^y}$ is the *result* when ***x*** reaches the boundary as indicated. For each condition, the result is shown for ***x*** greater than ***y***, ***x*** less than ***y*** and ***x*** equal to ***y***. It must be noted, although rather obvious, that for ***x*** and ***y*** not equal, the entity that is <u>not</u> designated as variable is held constant. However with ***x*** and ***y*** equal, they would of course both be variable.

As seen, there are a total of twelve boundary conditions (zero and one), six for ***x*** variable and six for ***y*** variable. Interestingly, an investigation of the boundary conditions indicates that certain similarities occur between groups of the boundary conditions. In addition, some have unique qualities that the others do not have, which indicate some sort of single or unique condition.

***<u>Figure 4</u>*:** Equation $\boldsymbol{x^y}$ (**result**) at boundary conditions zero and one:

1. *x* variable: $x \to 0$
   $(a)\ y < x;\ x^y \to 0$
   $(b)\ x < y;\ x^y \to 0$
   $(c)\ x = y;\ x^y \to 1$

2. *x* variable: $x \to 1$
   $(a)\ x < y;\ x^y \to 1$
   $(b)\ y < x;\ x^y \to 1$
   $(c)\ x = y;\ x^y \to 1$

3. *y* variable: $y \to 0$
   $(a)\ x < y;\ x^y \to 1$
   $(b)\ y < x;\ x^y \to 1$
   $(c)\ x = y;\ x^y \to 1$

4. *y* variable: $y \to 1$
   $(a)\ y < x;\ x^y \to x$
   $(b)\ x < y;\ x^y \to x$
   $(c)\ x = y;\ x^y \to 1$

In analyzing ***Figure 4***, all the conditions 1(a), 2(a), 3(a) and 4(a) must be excluded, because they all violate the boundary conditions. For example, as in 1(a), $\boldsymbol{x}$ goes to zero, $\boldsymbol{y}$ cannot be less than $\boldsymbol{x}$ because it would be less than the lower limit (zero). In all these situations the boundaries of one and zero would be breached, however it is noted that both variables $\boldsymbol{x}$ and $\boldsymbol{y}$, can exist *between* the boundaries. These conditions shall be designated as *definite linear equations* or simply *definite linears*.

The second group of boundary derivations 1(b), 2(b), 3(b) and 4(b) we shall designate as the *special linear equations* or *special linears*. These all are possible within and including the boundary conditions, however are unique in rather obvious ways as follows:

> In equation 2(b) the base number $\boldsymbol{x}$ goes to one; then the result $\boldsymbol{x}^{\boldsymbol{y}}$ also goes to one for all values of the exponent $\boldsymbol{y}$. With $\boldsymbol{x}$ at the boundary of one, it is equal to the result and is all-inclusive; the base and result are ultimately constant as one. Varying the exponent (when $\boldsymbol{x}$ is at the boundary of one) has no influence on the equation; it is always equal to one.
>
> The condition expressed in 4(b) indicates that when the exponent $\boldsymbol{y}$ goes to one, the result $\boldsymbol{x}^{\boldsymbol{y}}$ goes to the base number $\boldsymbol{x}$ for all values of $\boldsymbol{x}$. This condition describes the basis of conventional mathematics, the linear coordinate system. The exponent becomes one, and the nonlinear condition ceases to exist.

Conditions 1(b) and 3(b) we shall call the Linear Contradiction. These present a paradox in assuming the base number *or* the exponent as variable.

> *Linear Contradiction*:
>
> > 1(b) with the base number $\boldsymbol{x}$ equal to zero, for any value of the exponent $\boldsymbol{y}$ the result $\boldsymbol{x}^{\boldsymbol{y}}$ is equal to <u>zero</u>.
> >
> > 3(b) with the exponent $\boldsymbol{y}$ equal to zero, for any value of the base number $\boldsymbol{x}$ the result $\boldsymbol{x}^{\boldsymbol{y}}$ is equal to <u>one</u>.

Should both the base number and the exponent vary to zero, what is the result, zero or one?

Here we may assume from observation that variance within the continuum is continuous and uniform. It may be considered that if $\boldsymbol{x}$ and $\boldsymbol{y}$ both vary toward zero, even if they are independent variables, the variance of the equation must be toward one. Not zero. The Linear Contradiction is a mathematical illustration of the conservation laws of physics. Within the continuum, we cannot take anything to zero.

The paradox goes away if the base number and the exponent are mathematically dependent such that as one varies the other must also vary directly. In essence, if one varies toward zero the other must also vary toward zero. This leads to the boundary conditions 1(c), 2(c), 3(c) and 4(c).

With $\boldsymbol{x}$ equal to $\boldsymbol{y}$ the boundary conditions become redundant and we may substitute $\boldsymbol{x}$ for $\boldsymbol{y}$. The formula becomes the *base dependent exponential equation*:

$$x^x \,;\; 0 \le x \le 1$$

Chapter 12
Einstein's Perception
(As I see it)

Prelude

Many years ago when I first encountered nonlinear field theory, I was enamored that Einstein came up with such a concept. However, I don't think it was speculation on his part. He wrote about the possibility of an "open system" versus a "closed system," but as far as I know, he didn't express whether he necessarily concurred with one over the other. He just stated his ideas of the difference between them. At any rate, although he didn't say it exactly, I'm convinced he concurred with the notion of a closed system. That is, I think he believed the Universe returns upon itself (like the circumference of a circle or the surface of a sphere).

This seems evident to me, because he said that in his opinion, "singularities must be excluded." I believe his reasoning is that the only real singularities are "zero" and "infinity." And I definitely concur that they should be excluded in order to maintain conservation law.

[However, I do not accept that a black hole should be defined as a singularity. If black holes exist, they can be defined analytically within conservation law. We just haven't found the formulae to do that yet.]

Also, Einstein's famous (rather inconceivable) concepts pertain to the absolute and constant quality of the velocity of light and also the idea that time is a "fourth dimension." Following is my conjecture of how I think he arrived at these ideas and also my own concepts of the nonlinearity Universe.

This is my favorite chapter because there does not appear to be any valid proof for the theory presented here. Unlike the previous chapters in this writing, this chapter is purely speculation, a miscellany of inventions of the mind with no real proof. The following may perhaps be considered more creative than scientific, and for this reason it may be regarded as a bit "beyond the pale." But then again, that's not so unreasonable.

After all, this bizarre Universe we live in is "beyond the pale."

The Four-Dimensional Continuum

I'm not at all sure anyone understands Einstein's idea of a four-dimensional continuum or much at all about the Theory of Relativity. Years ago I remember reading about someone in higher academic orders who claimed to understand the Theory of Relativity "when no one else does," but I have my doubts. I think scientists that say such things are more interested in trying to convincing everybody they have reached an intellectually exclusive fraternity with Einstein that no one else is capable of reaching.

Anyway, in my opinion, "time" as a fourth dimension is a bit difficult to understand. It's much easier to comprehend time as synonymous with length, rather than as a fourth coordinate axis.

The major problem I have with a four dimensional coordinate system, is that by simply adding another term to the equation defining the continuum, the coordinate system still remains linear. And certainly (whether the continuum is either three or four dimensional) later in life Einstein was obviously aware that the Universe is nonlinear. After all, his final theory was based on that exact premise.

However, as explained following, the concept of a four-dimensional system perhaps reasonably led Einstein to the notion that the Universe is a closed system.

I agree with that concept, because it seems to me that if the Universe is four dimensional it would return upon itself (as a closed system).

Explained following, if we analyze models of one to four dimensions, each as a separate step, we see a correlation between each step that indicates a "closed" Universe rather than an infinite Universe. The following analysis may be a reasonable interpretation of Einstein's vision in this respect:

First we start by restricting the continuum to a one-dimensional Universe. We are thus confined to a line that is finite. Now we can travel from one end of the line to the other. That's about it. We can only go one way at a time until we get to one end or the other of the line.

But now to make life a little more interesting, let's say we curve the line into a circle and connect the ends. Now since a circle is two-dimensional, in essence by curving the one dimensional line through a second dimension, we have created a two-dimensional Universe. We can assume however, that we are still confined to the line (the circumference), and it's still only one dimension. If we travel from any starting point on the circumference and go far enough, we will return to our starting point. So, we may say that the circumference is one dimensional (a line), but it's curved through a second dimension (into a circle). It's the second dimension that brings us back to our starting point.

Now we'll take this another step further. We spin the circle 180º around like a top, thus creating a three dimensional sphere, and now we are confined to the two-dimensional surface of the sphere. If we start at any point on the surface of the sphere, and travel in any direction in an apparent straight line relative to the surface and go far enough, we will return to our starting point. Thus we may now say that we are traveling on a two-dimensional surface that is curved through a third dimension and the third dimension brings us back to our starting point.

Let's take this one more step. Suppose that we take off in a spaceship traveling in a straight line outward away from the earth. We are traveling in a straight line through a three dimensional space continuum. So, if there is a fourth dimension and we stay in an apparent straight line relative to the three dimensional system, we will eventually return to the earth. We're traveling through three dimensions, and the fourth dimension will bring us back to our starting point.

In this case, a forth coordinate axis lends itself well to the theory of a nonlinear closed Universe.

> [Einstein said "...the continuum is *apparently* restricted to four dimensions." Looking at the preceding analysis is seems that we would not be able to recognize a fourth coordinate axis. That is, we can conceive of three dimensions, but the fourth is not at all evident. For example, if the Universe is restricted to two dimensions (a circle) and we were confined to the circumference (one dimension), we would not be able to conceive of two dimensions. As far as we could tell, the Universe would just be one dimension. This leads to the idea that there are no more than four dimensions, because our perception only goes to three dimensions. That is, if there are five dimensions for example, we would be able to perceive four. Since we can't perceive four dimensions, four must be the limit. Whether that's reasonable or not is anybody's guess, but it's interesting food for thought.]

Time as Synonymous with Length

The only problem with the preceding analysis is in the comprehension of "time" as the fourth coordinate axis. Although I formulated and concur with the analysis, as stated previously, it seems easier to understand time as synonymous with length rather than as a separate coordinate axis.

For example, if we consider two points at rest with a certain length between them, we thus assume this length to be measurable as a constant in a linear system. We further assume a time differential between the two points, also measurable, however as a variable. Specifically, if we move from one point to the other, the length is considered constant and time is considered variable. That is, relatively speaking, if we move fast the time increment between the two points is small, and if we move slowly the time increment is large. However, if we assume both length and time as variable, the length and time differentials are essentially the same thing. That is, we may say that we shorten the length by moving fast and increase the length by moving slowly. This is also in compliance with the Lorentz-Fitzgerald contraction.

By this concept, time is considered the same thing as length.

A drag race is a good demonstration of this concept, as explained following:

Visualize that you are sitting in the grandstand at a drag race. We may say you are in "congruence" with the dragstrip as long as you are not in motion relative to it. That is, the dragstrip is a constant quarter mile relative to you. There are two dragsters staged at the starting line. They are also in congruence with the dragstrip as long as they're not in motion.

Now, the "Christmas Tree" lights flash down to green, and the dragsters take off down the dragstrip and across the finish line. Let's say it's a close race. The winner of the race is determined with a clock that measures the elapsed times from start to finish of each dragster. In essence, the winner of the race shortened the time increment between the starting line and the finish line, a little more than the loser did. In this case, the time increment is considered variable, but the length increment is considered a constant quarter mile.

However, suppose we take an opposite approach and consider the length between the starting line and the finish line as variable relative to each dragster and the time increment as a constant. Then we may say that the winner of the race shortened the length of the drag strip a little more than the loser did. In essence, by this scenario, "length" and "time" are synonymous.

This also leads to the perception that the velocity of light is an absolute constant. In essence there is some minimum constant time increment between the starting line and the finish line. For example, in accordance with the Lorenz-Fitzgerald Contraction [6], assuming the length of a dragstrip as variable, if a dragster should reach the velocity of light at some point along the drag strip, the remaining length of the dragstrip (ahead of the dragster) will go to zero. By this scenario, it seems pretty obvious that the velocity of light would be absolute. You can't go any faster, if the length ahead of you is equal to zero. It literally doesn't take any time to go zero distance.

The Lorenz-Fitzgerald Contraction indicates that the length in front of the dragster would go to zero if the dragster reaches the velocity of light. However, assuming the Universe is closed, the entire length of the Universe would go to zero. That is, the Universe would be like a circle, so the length ahead of the dragster ends back at the dragster. So the entire circumference would go to zero, and thus the entire Universe would go to zero relative to a dragster traveling at the velocity of light.

As stated previously however, I say the Universe doesn't really go to zero relative to a dragster traveling at the velocity of light, because that would violate conservation law. However, I do think that the Universe would contract to a very small size (or minimum time increment) relative to something traveling at the velocity of light. That is, the Universe would actually "approach zero" as asymptotic. The velocity of light is not an absolute linear constant. It's actually a nonterminating decimal that is asymptotic to a linear state. This of course is an approached linear state, because actual linearity doesn't exist.

This leads to another rather interesting idea considering both length and time as variable. Light beams leave a star in all directions. Therefore (again in accordance with the Lorenz-Fitzgerald Contraction), the length of the Universe would approach zero in all directions relative to the light beams, and the light beams would travel to the extremity of the Universe very quickly (almost instantly). With a closed system, once light beams reach the extremity, the light beams will have returned to their starting point: that is they will have returned to the star where they originated. With such a system, a star is essentially feeding itself. Could this account for nuclear fusion? Is this the reason stars don't burn out? (That sounds good, but actually I have no idea.)

Of course, it seems that at least some of the light energy would be absorbed by other masses (planets, moons, galactic dust and such) throughout the Universe, but some light from all the other stars would perhaps partly make up for the loss. Eventually the star will burn out once all of its light energy is absorbed by all the other masses in the Universe.

Interestingly, it might take a long time for a star to burn out relative to you and me (since we are not traveling at the velocity of light), but it seems it would burn out instantly relative to the Universe as a whole. Also, since we are not traveling at the velocity of light, the Universe is very large relative to you and me, but relative to light beams, the Universe is extremely small, and it seems, so would be the mass in the Universe.

This would also reasonably account for the fact that a gas-giant would have to be a certain mass relative to the entire Universe before it will become a star. Jupiter's mass for example is too small to emit enough energy to "light-up." In essence, Jupiter's energy emission (although greater than the amount of energy it receives) is too small, and the amount of mass in the Universe is too large relative to Jupiter. There isn't enough energy emission coming back, because most of it's absorbed by the other masses throughout the Universe. In this sense, laboratory nuclear fusion would be too small to sustain, because the energy would be instantly absorbed by all the masses in the Universe. There is a threshold mass at which a star will ignite. That is, it seems a reasonable assumption that this threshold mass is somehow proportional to the entire mass in the Universe, whatever that is. This presents an interesting theoretical study in determining the size of the Universe relative to velocity.

The Micro Macro Correlation

This is my favorite theoretical study. It is my original theory; however, I have no solutions for it. The following is an excerpt (with updates) from the primary reference book and is purely conjecture with no analytical proof. That's what makes it interesting. The following leaves a lot to the imagination.

Present physics theory defines a length of "space" between two points. This definition does not conform to conservation law. That is, space has dimensions but no viable properties to analyze. In essence, it appears that we have only the laws of mathematics to deal with. The only real concern is that the space continuum must follow conservation law or else it wouldn't exist, because without conservation law a scientific explanation is impossible.

In order to identify a nonlinear variance, a simplification absent of the Cartesian system is suggested. We will assume a direction of space must be considered as simultaneous directions into the *micro* [logarithmic variance] and into the *macro* [exponential variance] rather than some dimensional analysis of a three or four dimensional linear system. In essence, the multi-dimensional concept, employed in linear derivation, is cumbersome and does not accurately portray length variance from a reference point. Instead we will consider a reference point as a nonterminating decimal approaching linearity at tangent to the curvature of the space continuum. A reference point we will define as a *point of congruence*. And also we shall state that should one such point exist, then all points within the continuum must conform to this analysis and therefore, *any* point within the Universe exists at its individual *point of congruence*.

Each point is both the beginning and the end of the Universe and is depicted graphically at the reference point (1, 1) on the graph of the *base dependent exponential equation* shown in Graph 3 (Chapter 8).

Here it is assumed that the *micro* and *macro* variances are simultaneous and coincident effects [compensating effects in compliance with conservation law] as perceived by the observance of a body moving away from a condition of congruence [an arbitrary reference point]. As defined by the perspective variance, standard units of measure are perceived to diminish proportionally with a length from a point of congruence [approached linearity]. That is, relative to a reference point, the variance of standard units decreases as the overall length increases from the reference point. We may say the length is increasing at a decreasing rate (as measured by standard units) and is thus varying into the *micro*. However, it becomes apparent that the space continuum itself must be varying into the *macro* relative to the reference point, as a compensating effect adhering to conservation law. In essence, as variance occurs into the *micro*, variance must also occur into the *macro* in order to maintain the entire length measurement as constant relative to the reference point. This we may refer to as conservation law of the overall space continuum [the Universe].

We may now consider the Universe as a closed system that returns upon itself. Here we may hypothesize that the *micro* and *macro* continuums are actually inverses and equal [the same things]. In essence, the *micro* continuum is the inverse of the *macro* continuum and they equate at a *point of congruence* (any reference point in the Universe).

To exemplify the preceding, we will imagine a telescope is constructed with such power that through it we can see the maximum distance into the *macro* continuum. In addition, we imagine a microscope is constructed of such power that we can see the farthest (smallest entity) into the *micro* continuum. With both instruments at the same point in space, when viewing at maximum distance, we would be looking at the exact same point, whether we are looking through the telescope or through the microscope. That is, due to the exponential nature of the Universe, with a measurement taken from any point in the Universe, the maximum distance in the *macro* equates exponentially to the maximum distance in the *micro*.

It has been surmised that stars are similar to atoms. By the preceding scenario stars and atoms may in fact be the same things just viewed in different directions: atoms in the *micro* and stars in the *macro*. And also, gravitational force (*macro*) and electromagnetic force (*micro*) would also be the same things (rather than separate forces) with exponentially different magnitudes.

Never the less, it's apparent that we are now working with two entities within the scientific explanation of length variance within the cosmos: simultaneous variances into the *micro* and *macro* continuums, one as the inverse of the other.

To be continued.

References:

1. Carl Sagan Productions, Inc. (1980); *Cosmos*, Random House, Inc.; ISBN 0-394-50294-9

2. Michael D. Lemonick (2003); *Echo of the Big Bang,* Princeton University Press; ISBN 0-691-10278-3

3. George B. Thomas, Jr. (1966); Third Edition, *Calculus and Analytic Geometry*, Addison-Wesley Publishing Company, Inc.; Library of Congress Catalog No. 60-5015

4 Joseph Silk (2001); *the Big Bang*, Henry Holt and Company, LLC; ISBN-13: 978-0-8050-7256-3

5 Albert Einstein (1956 by the Estate of Albert Einstein); Fifth Edition, *the Meaning of Relativity Including the Relativistic Theory of the Non-Symmetric Field*; Princeton University Press; ISBN 0-691-02352-2

6 Arthur Beiser (1967); *Concepts of Modern Physics*, McGraw-Hill Book Company; Library of Congress Catalog Number 66-23389

7 Wendy L. Freedman *et al* (2001); *Astrophysics Journal*; Volume 553 Issue 1; (published several places on the internet)

8 Wikipedia Encyclopedia (2009 & 2016) on the internet:

   a. Big Bang
   b. Electromagnetic Spectrum
   c. Wien's Displacement Law
   d. Cosmic Microwave Background Radiation (CMB)
   e. Georges Lemaître – the priest who was first to derive Hubble's Law ($v = H_o D$); (2016)
   f. Definition of *pseudoscience*; (2016)

9. Tony Hey and Patrick Walters (1997); *Einstein's Mirror*; Cambridge University Press; ISBN 0 521 43532 3

10. G. S Williams and Allen Hazen (1914) Second Edition; *Hydraulic Tables*; John Wiley & Sons, Inc.

Primary Reference:

11. Bruce Erkiletian (2002); *Premise Theories of the Micro Macro Correlation*, Hardbound Inc.; ISBN 0-9722736-1