Exploring Two Natural Central Force Fields; Gravity and Nuclear with a Unit Circle and Unit Parabola Analytics.

A Sand Box Geometry Philosophical Exploratory

A PARAMETRIC PHILOSOPHICAL UTILITY from the SAND BOX

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Using a Unit Parabola curve Analytics to Explore Natural Mechanical Energy Lines and Curves of the Creation	June 2019

Parametric Geometry utility of a unit parabola focal radius can be construed as a useful tool when exploring curves, both artificial and Natural. 21st century mathematics has a plethora of manufactured curves to play with, while dynamics of mechanical energy of Nature seems to be happy with two curves from antiquity. I use these same two curves to analyze the Central Force G-field connection between M1 & M2. A circle works as holding pen for curvature, Sir Isaac Newton's inversed displacement radii; and a parabola traces changing motive energy of M2 using its loci as a period time curve. Two parametric curves and two frames of reference. One frame of reference is Galileo's Central Force Constant Acceleration, and the other frame of reference? Sir Isaac Newton's Changing Acceleration. Both belong with the Art of Classic Mechanics. The combined parametric geometry of these two plane curves provides a parametric function, a means to construct and analyze Natural Mechanical Energy Curves of two Central Force Fields. Gravity and Nuclear.

Constructing and reading Natural mechanical energy curves with a Sand Box Geometry CSDA

This composition by Readings is derived from several years of thought. Several articles and several 'start agains' because no interest seemed to exist about my doins' for the last 25 years. This cover page was started 2019 and visited/edited again by me today (5/30/21). My thinking is always (TIP) thoughts in process. An example of TIP is reference of 20th Century space time as a 'tell-all' of God's Creation by the learned. After 25 years working this stuff, I see that spacetime as put forth by the thinkers of the 21st century is akin with learning to walk. First learn to crawl. So far, referencing space time geometry, I find three S&T's. Sir Isaac Newton is S&T2.

I use seemingly out of place assignment as reference location in my library. Where it is! I try and set such declarative in font Comic Sans.

Index and chapter

CHAPTER 1: Three Space and Time Squares of the Human Experience

The first successful exploration of a central force field would be Galileo and his incline plane. I call this landmark of the human knowledge tree, Space & Time Square1 or S&T1.

Our current view of Space-Time implies an aggregate of M_2's rolling around a sink-hole indent from M_1 on a black fabric plane of space-time. Great mental picture to convey the concept of space curves but extremely difficult to analyze.

Galileo's S&T1 provides the source primitive for all S&T space and time squares to come. S&T squares are born in Descartes 1st quadrant. 1st quad constructions provide positive natural numbers (counting integers) to construct a Uniform Acceleration time square. This allows utility of Euclidean definition of a square, congruent sides, providing a one-to-one correspondence. One unit time as S&T range with one unit space as S&T domain.

Three space and time squares of the human experience (S&T1.BSS)

If we select the timeline Galileo as that point in human history where we recognized our Earth is not the center of Creation; we begin with Space and Time Square1 (S&T1). Let me suggest two more S&T's as significant milestones of our human knowledge base. (S&T2) would be Sir Isaac Newton and his Universal Law of Gravity. Followed by (S&T3); late 19^{th} Century and early 20^{th} Century collective development of Quantum Thermodynamics.

I intend to develop Natural Curved Space tools of exploration, my Curved Space Division Assembly (**CSDA**), how to use it, then in order, construction, and analysis of; S&T1, S&T2, and S&T3.

- S&T1: Galileo; Constant Acceleration Space and Time. (My provenance of thought)
    - MAA MathFest August 2015
    - Wolfram technology Conference October 2015
- S&T2: Sir Isaac Newton; Changing Acceleration Space and Time. (My provenance of thought)
    - JMM meeting January 2014
    - Wolfram Technology Conference October 2014
- S&T3: Quantum Small; Constructing atoms of the Periodic Table, Space and Time of nuclear level energy curves holding atoms together. Quantum Thermodynamics Experience of like element Atoms, what happens when atom sweat or become very, very, cold. Electromagnetic Bonding. (My provenance of thought)
    - Wolfram Virtual Technology Conference October 2020

CSDA construction of three Natural Space and Time Squares:

```
ParametricPlot[{{1Cos[t],1Sin[t]},{t,t^2/−4 + 1},{t,t},{t,1},{1,t},{3/2,t},
{t,7/16},{5/2,t},{t,−9/16},{t,(t − 4(13/4))},{13/2,t},{2,t},{1/8,t},{t,9/8},{1,t},{t,2}},
{t,−4,14},PlotRange → {{−1.5,3},{−1.5,3}}]
```

The Wolfram Language (Parametric) linear code has been re-drawn using drawing tools. Overlay lines and curves of drawing tool utility are true representations of lines I imagine construct all three S&T squares I write about.

S&T1: (j) is a 1st second free fall above the surface acceleration curve of M_1. S&T1 has two diagonals. Surface acceleration curve and free fall linear diagonal to central force **F**.

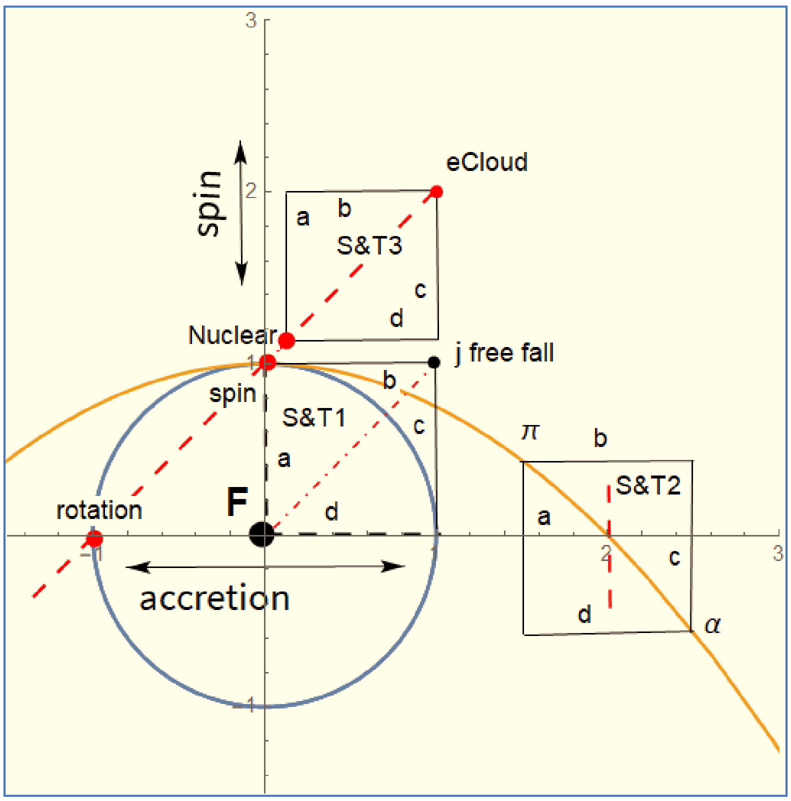


Figure 1: Basic CSDA representation of three S&T square. S&T1; Galileo, S&T2; Sir Isaac Newton, S&T3; 19th and 20th Century Collective; Quantum Thermodynamics.

S&T2: energy curves possessed by orbit of M_2 are labeled as limiting curves; high energy and low energy not perihelion/perigee or aphelion/apogee. S&T2 Central Force **F** is M_1. M_1 rotation plane is labeled accretion, and M_2 motion is plotted on the parabola period time curve. S&T2 has one curved diagonal.

S&T3: S&T3 connects nuclear corner of space and time with ecloud corner of same space and time. S&T3 has one linear diagonal connecting nuclear shaping forces of the nucleus and ecloud with spin and rotation of the atom. S&T3 explores Quantum level thermodynamic experience of Q (heat) and electromagnetic bond.

Please note!! Important; S&T1, S&T2, and S&T3 all share a relative connection with the same central force spin and rotation axis!

CHAPTER 2
Unit Circle, Unit Parabola and Space Curves

Defining a Curved Space Division Assembly (**CSDA**):
To make a parametric geometry construction a function using these two curves (unit circle and unit parabola), we need assign calculus terms. The unit circle will be the Independent Curve and the unit parabola will be the Dependent Curve.

From the Calculus: If a plane curve, is revolved about a fixed line lying in the plane of the curve, the surface generated is called a surface of revolution. The fixed line is called the axis of the surface of revolution, and the plane curve is called the generating curve.

The search for a dependent generator curve for use in g-field geometry has requirements. It will most probably be a conic (it is). It should also be symmetric about the solar spin axis and contain a single central force focus. Considering that we wish to analyze curvature of a field, a curve that is a function and twice differentiable would facilitate such an effort. The only conic meeting these requirements is the parabola. As a generator curve, it will produce a surface that is symmetric with spin giving us a degree two dependent curve focus synonymous with a degree two independent central force center.

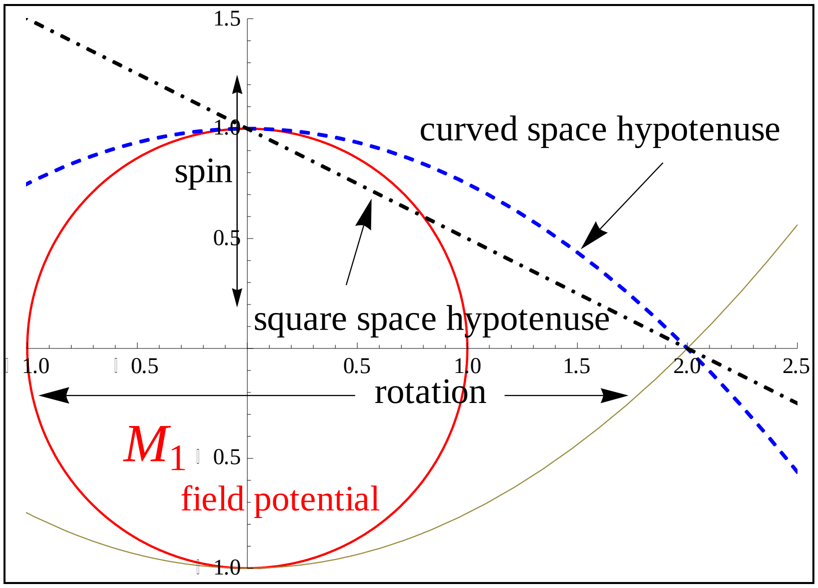
There are several reasons for picking a plane geometry parabola.

1. The parabola is a curve that can be constructed geometrically as a twice differentiable function. This requirement will permit the study of changing field curvature in the micro-space infinity of occupied macro-space by the field.
2. The parabola has one focus. A Central Force field geometry, such as gravity, is simplified with one center and focus.
3. The parabola can be used as a period time curve when its latus rectum chord is used as the average energy and diameter of M_1M_2 orbit curves.
4. The parabola will hold a constant meter of linear space between loci, focus, and directrix. Just as a circle holds constant meter of center and circumference.

Together, these two plane geometry curves provide a standard frame of reference enabling mapping and discovery of constant and changing mechanical energies caused by central force accelerations.

CAGE FREE THINKIN' FROM THE SAND BOX

The square space hypotenuse of Pythagoras is the secant connecting (π/2) spin radius (0, 1) with accretion point (2, 0). I will use the curved space hypotenuse, also connecting spin radius (π/2) with accretion point (2, 0), to analyze g-field mechanical energy curves. We have two curved space hypotenuses because the gravity field is a symmetrical central force and will have an energy curve at the **N** pole and one at the **S** pole of spin: just as a bar magnet. When exploring changing acceleration energy curves of M_2 orbits, we will use the N curve as our planet group approaches high energy perihelion on the north time/energy curve.



CSDA demonstration of a curved space hypotenuse and a square space hypotenuse together.

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(DELL USBE:\CSDA book part 3) PART1

ON THE UNIT PARABOLA METER OF CENTRAL FORCE ENERGY CURVES

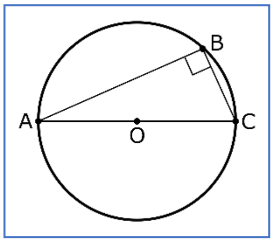
Radii of circles are the principal meter of curvature. Differential Calculus will use curve framing to measure changing curvature. Curve framing, a tangent at and tangent normal with a considered point on a curve, will hold the radius of an osculating circle coincident on the tangent normal of the frame. This tangent normal provides a connection $(radius)$ of the osculator with the point, allowing analytics of changing curvature using changing osculating radii.

A parabola focal radius and its loci provide two analytics:

1. focal radii connect of central force **F** with M_2 motion, using a **CSDA** time curve, tracking changing energy $\left(f\ (r)\right)$ following Sir Isaac Newton's displacement radius (r).
2. curvature, a differential geometry evaluation of changing curvature following moving points on the curve's loci. (See my blog June 22, 2019 @ sandboxgeometry.info)

Number 1 is a Natural fit for M_1M_2 mechanical energy curves. Here is how.

Changing curvature is metered with centers of osculating circles. These centers relocate as the point moves from initial place to final place on the curve to accommodate changing linear space between (CoC) and the point as a 'new event' radius of curvature. To construct this 'new event', initial center must move to final center. Suppose Inverse square energy curves *deny* physical relocation of a central force point mass **F**, which after all is center to the field, and thereby will forbid change of position unless acted upon by another central force? If the center of a central force is fixed, we need a method to trace changing curvature of stable orbit loci that does not move the sun off system center to accommodate 'new event' radii. Enter Thales 2600-year-old Theorem about diameters and right triangles.



https://natureofmathematics.wordpress.com/lecture-notes/thales/

https://commons.wikimedia.org/w/index.php?curid=1935853

Thales's theorem: if AC is a diameter and B is a point on the diameter's circle, the angle ABC is a right angle.

In the commons diagram from Wikipedia, let the diameter (AC) become a $(N \leftrightarrow S)$ spin axis of central force **F**.

Figure2 is a dynamic GeoGebra construction.

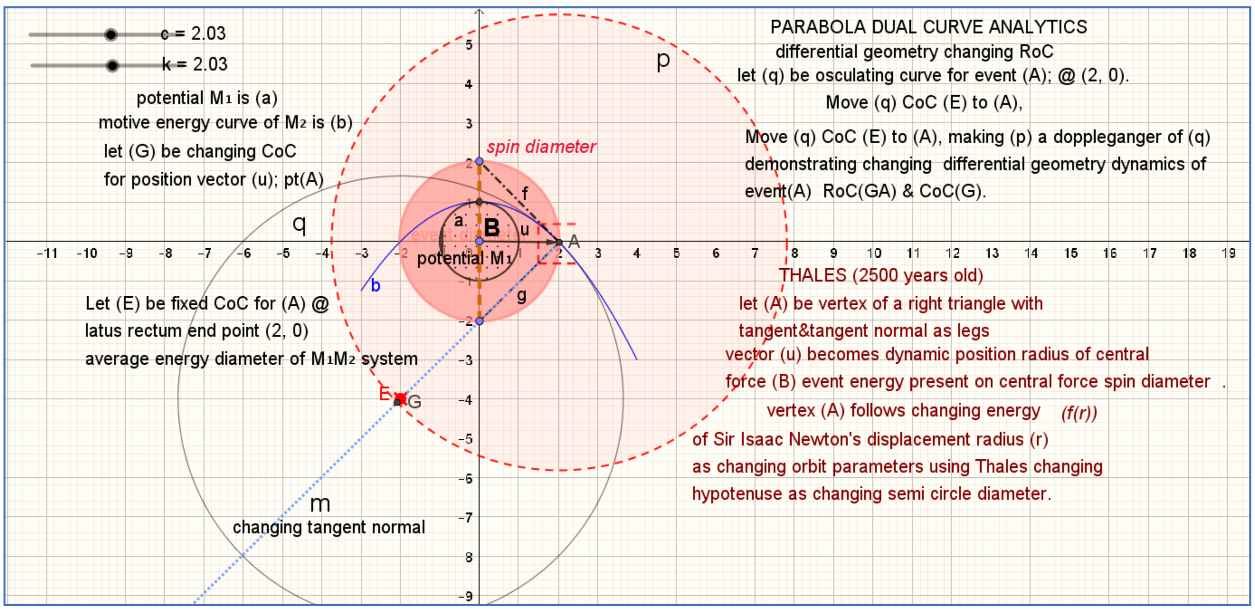


Figure 2: Let (u) be position vector of **F**. let curve (q) be osculating curvature for event (A) at (2,)0). if we move CoC for (q) (E) to event (A) we set (q) center of curvature (CoC,E@A) as center of doppelganger (p). Curve (p) can now be made dynamic demonstrating changing differential curvature of event (A) on time curve (b) with respect to central force (B). *[backupS&T1, reledia].*

The following link takes a visitor to my GeoGebra cloud account for a dynamic demonstration of Thales 2600-year-old differential geometry of Natural Orbit Energy curves.

[Thales Differential Geometry – GeoGebra]()

G-field CSDA Analytics

Parabolas are Dependent Energy Curves and enjoy fixed center analytic curve framing, sketching changing diameters of M_2 orbit events about M_1.

Position vector magnitudes are radii of M_2 orbit curves, follow changing energy $(f(r))$ on the dependent curve as range to the domain of Sir Isaac Newton's displacement radius (r). As position vector (u_1) approaches high ecurve perihelion, we have two energy records, (a) and (k), following Sir Isaac Newton's displacement radius (r) point (C). Orbit motion is composed of potential (a), and motive energy (k) of M_2. Dynamic abscissa (l) connects $(r, f(r))$ as relative orbit mechanics; $(position, positione)$.

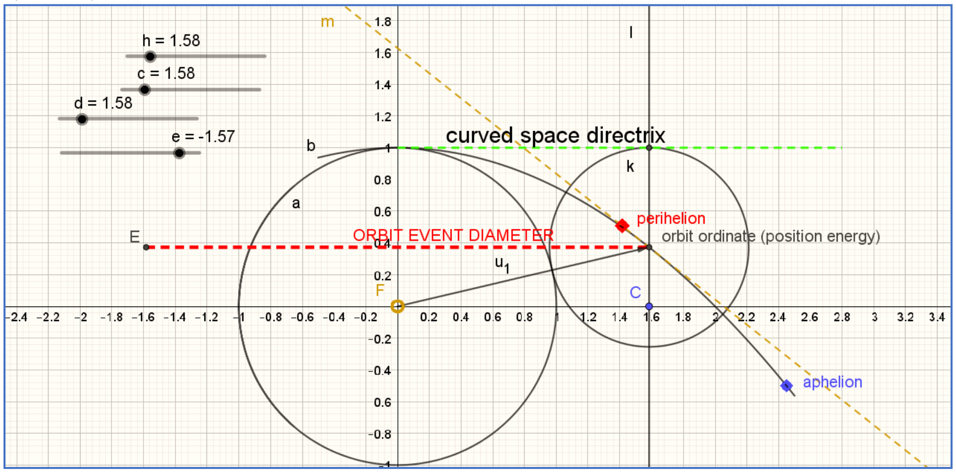


Figure 3: **CSDA** construction of M_1 M_2 high(e) orbit event.

Position vector (u_1) approaching low ecurve aphelion. Curve (k) is dynamic orbit motive energy. (k) changes shape as (C) orbits M1. Curve (E) represents changing orbit diameters.

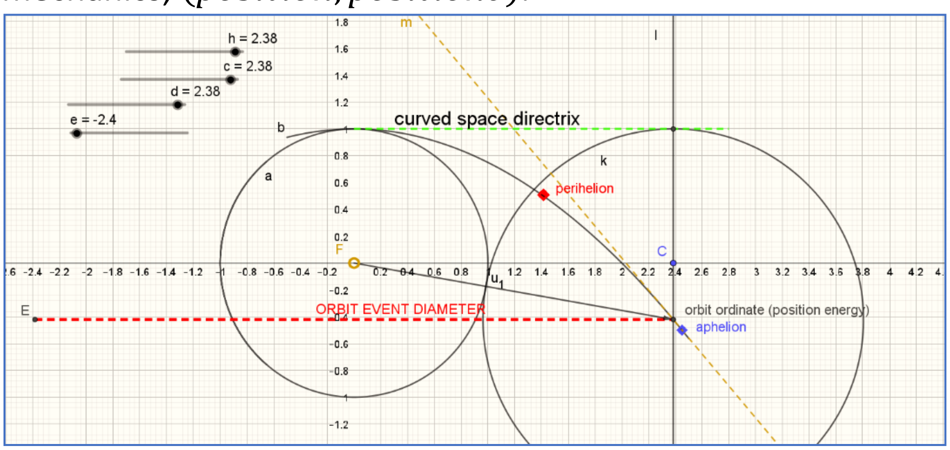


Figure 4: **CSDA** construction of M_1M_2 low(e) orbit event.

Click on the following URL to see dynamic construction. You will need GeoGebra (5) in your machine to make it work.

[M1M2 shared mechanical energy curves – GeoGebra]

Acceleration Spheres of Influence (ASI, discovery and analytics)

(BackupS&T1, CSDAparametricG,Presentation2018)

I feel a review of my 2008 Copyrighted efforts (admittedly edited a bunch when looking back from2021,) concerning Gravity, will best explain a **CSDA** discovery analytics for two types of acceleration curves. For me, Calculus & Physics 101 became the 'medieval scribe' tools I needed to create a new library to record my visions sourced from my imagination. As good a place as any to start a simplification of rigid sculpting of Human Natural Knowledge Base presented us by the masters of antiquity. Too numerous to mention but I must recognize those who I have taken guidance from aiding my pursuits.

Apollonius and Euclid. Kepler and Galileo. Sir Isaac Newton, Leibniz, Bernoulli Bros., Gauss, B. Reimann, Clausius, Boltzmann, Mendeleev; and the late 19th century 20th century collective discovery of Quantum Thermodynamics.

CONSIDERATION 1 (2008)

ON THE PLANE GEOMETRY

OF

INDEPENDENT ACCELERATION CURVES

*THE COMPOUND CURVATURE OF ACCELERATION

*ACCELERATION AND THE G-FIELD **ASI**

*ACCELERATION AND WEIGHT

A METHOD TO DETERMINE

INDEPENDENT ACCELERATION CURVATURE

OF A POINT MASS [F]

AS ORBITAL CENTER

ON THE GEOGRAPHY OF CONSTANT ACCELERATION CURVES FORMING A GRAVITY FIELD 3-SPACE ORBITAL.

The principal key stone of gravity field sustainable stability would have to be acceleration. Wherever mass collects so will acceleration. It is the glue holding us fixed to the surface of our Earth with our doggedly unchanging weight (constant acceleration), as well as the prime mover giving our planet group period motion about our Sun (changing acceleration). The experience of both acceleration is the composition of two curves, a geometry of distinct and individual parts. Calculus will separate and identify g-field compound curvature assigning independent status to the phenomena of constant acceleration with the fixed radius of a sphere and dependent status to phenomena of changing acceleration using changing focal radii and parabola loci to paint a period time and energy curve.

Only one geometry object has a constant radius *and* shape lending itself immediately to the task of defining constant acceleration, circles. Since calculus will be used to separate the compound curves of acceleration, a degree two description of these curves must be "exponentially" relative with its (primitive) degree three shape from which it came as well as the degree2 surface area of degree3 shape. In other words, profile symmetry of 2-space linear (degree1) perimeter sourced mathematically (with differential calculus) from a 3-space volume closed curve (spheres) is required to permit analytic geometry interpretation of 3space happenings with a simplified 2space profile shape representing mass/volume ratio content of M_1.

Central force descriptive parametrics should be able to transition calculus altering of terms, volume $\left(\frac{4}{3}\pi(r^3)\right)$ and surface area of volume (($4\pi r^2$). A degree3 morph of volume into a degree2 evaluation of amount of surface space meter required to contain volume, keeping unchanged profile shape of volume.

Another step down the *dimensional* number line of shaped space we find exponents of 2space. We find area of circumference (degree 2, $(\pi r)^2$) which can be morphed into a degree1 perimeter $(2\pi r)$ of specific length.

I reference shapes in space because I intend to analyze 3-space mechanical happenings of a mass/volume central force using profile symmetry. An admittedly ancient Euclidean concept; congruent profile between 3space volume and its surface, and 2space perimeter and its area. .

AN ALTERNATE LOCUS FOR AN EASIER WAY: I have two reasons motivating a search for the above-mentioned plane geometry curves needed to map g-field constant acceleration *surface* potential and changing motive energy curves of orbit motion.

The first one is the difficult nature of elliptical curves. Karl Friedrich Gauss developed elliptic integrals to aid his calculations applied to early solutions of questions concerning celestial mechanics, in particular the orbit of an asteroid glimpsed then lost. Karl Friedrich Gauss predicted time and location of return with elliptical integrals. An integral is the literal transition of a locus from degree n-space to degree (n+1) space. It is a metamorphosis of two related entities, the primitive source, and the pursued differential calculus resultant term. No geometric object better remembers its shape when suffering such exponential transition then the radius of 2-space (the circle) and radii of 3-space (the sphere). Considering everything we see in our celestial back yard is a spherical average after oblateness and given integrals and derivatives of spherical space can morph between (n) space and $(n \pm 1)$ space in a precise and exact manner, why not leave the uncertain difficult elliptic transitions of (elliptical) duo radii/foci for familiar spherical 3-space of a single radius to meter central force displacements with respect to field center **(F)**.

$$\partial_r \left(\pi \left(r^2\right)\right)$$

$$2\,\pi\,r$$

Area of a Circle and the enclosing perimeter: (a 2space happening)

$$\int 2\,\pi\,r\,dr$$

$$\pi\,r^2$$

$$\partial_r\,(\pi r^2) \leftrightarrow \int (2\pi r)$$

$$\partial_r \left(\frac{4}{3}\,\pi\,\left(r^3\right)\right)$$

$$4\,\pi\,r^2$$

Volume of a sphere and enclosing surface area of that volume: (a 3space event)

$$\partial_r \left(4\,\pi\,r^2\right)$$

$$8\,\pi\,r$$

$$\partial_r\left(\frac{4}{3}\pi r^3\right) \leftrightarrow \int (4\pi r^2)\,dr$$

Why can't our math jump from dimensional 3space (surface area) straight into dimension 2space circumference and area of circumference?

It has to do with vectors. It is not easy to construct imagery of lines and curves in 3space, vector rules are used so that person 1 can perform the same construction as person 2: the same guarantee of performance by using a score for music.

A 3space 3axis system is formed with 8 octants. A 2 space Cartesian coordinate system is done on a plane with 4 quadrants.

If we let the z-axis spin in a 3space diorama, we utilize the 3space plane as a central force equatorial great circle with which to rotate a field sphere. Let z-axis spin be spherical rotation of a central force **F** (M_1).

It is here we have difficulty jumping from a surface to a circumference keeping the same shape as volume. If we look at our sphere in a math type way with rules hidden behind a curtain, we find two floating hemispheres, one N and one S, divided by the 3space planes synonymous equator. Making their spherical equator a great circle on the 3space plane, we can imagine a rotating spherical field on the plane of 3space.

Let one hemisphere be up spin with a N vertex and one hemisphere be down spin with the S vertex. They are distinct from each other. Let the N hemisphere float on the + 4 octants hence N is +spin. Let the S hemisphere works the – 4 octants hence S is -spin giving us our 8-octant space to work with.

We no longer have a purely math sphere but a central force phenomenon with a N pole, S pole a field of electric charge (+ and −) and mass volume potential.

Our surface form is $(4\pi r^2)$. To get to degree2 area of 2space circumference we need to eliminate surface coefficient4, as we no longer need stay in 3space and division by number 4 will eliminate 4(octants) experience.

Surface acceleration points coloring the hemisphere surface cannot be supported once the 3space frame is removed, fall directly toward the 4quad plane of

Descartes, and color the linear circumference outline with degree2 area points taken from the degree3 surface term.

We have now enabled a Sand Box Geometry **CSDA** to analyze, construct, and explore mechanical energy curves of degree3 curved space happenings.

SCHOLIUM: DIFFERENTIATION AND INTEGRATION OF A SELECT EUCLIDEAN RADIUS WILL TRANSITION BETWEEN THE THREE SPACE VOLUME OF IT'S SPHERE, AND THE TWO SPACE AREA OF IT'S PROFILE, REMEMBERING THE SHAPE OF BOTH CURVES.

1) A RADIUS OF SURFACE AREA and its (VOLUME).
2) A RADIUS OF PROFILE PERIMETER and its (AREA).

DIFFERENTIAL AND INTEGRAL CALCULUS IS A TWO-WAY STREET REMEMBERING PARAMETRIC GEOMETRY SHAPE, SO AS TO MAINTAIN CONGRUENT RELATIVE SHAPES OF DIMENSIONAL SPACE A CENTRAL FORCE MUST POSSESS CONNECTING SQUARE SPACE RADII OF MACRO-INFINITY WITH CURVED SPACE CURVATURE OF CENTRAL FORCE MICRO-INFINITY.

We can always integrate the meter of spatial boundaries of single center curves to return to the primitive volumes/areas they cover precisely and exactly.

My second elliptical objection is simply the fact that a symmetric curve in space relative with a single focus/center must exist. A smooth and continuous three space surface that will construct changing acceleration space curve of gravity. Smooth and continuous are language friendly math terms, in that they mean what they imply. The three-space curve sculpting our planet orbit energy must be smooth and continuous having no abrupt holes in which to leak stable acceleration energy into space causing our planet escape from solar gravity and leave the solar system or conversely, tumble into the sun.

I also find symmetrical curvature along each axis of an ellipse contradictory when one considers Kepler's 2nd Empirical Rule of equal area (orbit "sweep") per unit time. This cannot occur when equivalent velocity is presupposed with equivalent curvature. If elliptical minor diameters are average diameter of rotation, we have congruent curvature and the same read of orbit velocity on the period time curve whether approaching or receding from equinox. If we require the end points of whether approaching or receding from equinox. If we require the end points of elliptic major diameters to be highe perihelion and lowe aphelion of orbit period, they must have different orbit velocity. Different velocity requires distinct curvature to shape these diameters. Differential geometry requires the curvature of perihelion to be different from aphelion as we know the radial description of aphelion and perihelion displacement from the sun is not the same. Elliptic loci have congruent curvature at both major and minor axial end points. Not good for constructing a Natural Energy geometry of orbit mechanics, but good enough for a macro-space Pluto intercept.

If we select the obvious choice for constant acceleration curves, a plane geometry circle, we have only one more curve in our Euclidean stable that will have loci loyal to a single fixed center and possess ability to track and define curvature of changing acceleration, the parabola. Since the g-field experience is twofold, constant, and changing acceleration, suppose we construct a reference frame with two curves, an independent curve, and a dependent curve. Constant acceleration and constant curvature potential of a Gravity Field system will be depicted with our unit circle while changing acceleration and changing curvature will be depicted using the dependent curve unit parabola, making the parabola a function of the unit circle potential. The following theorems are needed to establish a standard parametric geometry model with which to develop independent and dependent acceleration curves of gravity.

FIELD SPACE THEOREM 1: EVERY POINT ON THE SURFACE OF A GRAVITY FIELD ACCELERATION CURVE IS A POSITION VECTOR OF **F**.

This theorem is self-evident. A position vector is an origin vector and **F** is Newtonian center. The center **F** has a straight line through space connecting any point unto its influence. Such a straight line makes all points in the space occupied by **F**, a radial displacement from **F**.

FIELD SPACE THEOREM 2: THE ACCELERATION EXPERIENCE OF ANY POSITION VECTOR OF **F** IS AN INVERSED DEGREE2 EXPERIENCE. WHERE THE VECTOR MAGNITUDE IS SQUARED AND INVERSED, BECOMING THE DENOMINATOR OF SIR ISAAC NEWTON’S UNIVERSAL LAW OF GRAVITY.

This theorem assigns the magnitude of the position vector as the radius of definition for inverse square experience giving the position point an acceleration experience. Shape of acceleration curved space is derived from Sir Isaac Newton's Universal Law of Gravity.

FIELD SPACE THEOREM 3: EVERY POINT IN OCCUPIED SPACE OF **F** IS A MEMBER OF A SUB-SET OF POINTS HAVING EQUAL ACCELERATION EXPERIENCE. THIS SUB-SET OF POINTS WILL FORM A LOCUS DEFINING A SPHERICAL SURFACE OF INFLUENCE ABOUT ANY POINT MASS **F.**

Constructing an ASI: Since any position vector is essentially a radius from **F** by Field Space Theorem 1, this radius can be used to define a semi-circle on the spin axis with **F** as center. The revolution of this semi-circle will produce a spherical surface **ASI** in the 3-space of **F**.

ON INDEPENDENT GRAVITY CURVES: ACCELERATED SPHERE OF INFLUENCE, THE **A.S.I**.

The concept of an **ASI** is based on Field Space Theorem 3. Any point in field space is a radial displacement from **F** becoming the radius of definition defining changing forces of acceleration. This one point as a position vector is a member of an infinite subset of position vectors all sharing equivalent displacement (and equivalent acceleration experience) from Newtonian center. Each position vector member of this set is a part of a locus defining a spherical surface of points in the space occupied by **F**. An **ASI** is the foundation of an orbital reference frame. An **ASI** is to field space, what a straight-line segment is to plane geometry. A basis to meter acceleration using liner radii as position in curved space.

If one **ASI** is a base of field measure, changing motive energy of (M_2) motion on the dependent period time curve in field space is the comparative of two **ASI's**. I intend to use two **ASI**'s as "bookend" limits of orbit period. Since acceleration changes **K.E.** of orbit, there is a sense of intensity with the descriptive utility of **ASI** acceleration experience. The highest intensity **ASI** is always the closest to **F**, holding greater **K.E.** of orbit, and the **ASI** of lower intensity is always the more distant, recording the lesser **K.E.** of orbit. All **ASI** found between the orbit energy limits of perihelion and aphelion are **DEFINITIVE ASI** and will record changing spherical shape of orbit using Thales dynamic focal radii to point out a curve frame@ $(r, f\ (r))$

The **PRINCIPAL ASI** content, M_1 mass/volume potential, structures gravity field mechanics. The radius of the **PRINCIPAL ASI** $[r]$ is equal to $[p]$ of its construct dependent unit parabola. Having parabola $(p) =$ radius (r) will sum available energy for an (M_1M_2) orbit by assigning the Latus Rectum (4 $[p$ or $r]$) as the system rotating diameter where average energy and curvature for stable orbit will be found. The dependent unit-parabola curved diagonal is time sensitive and has arc length (period/2) between energy limits perihelion and aphelion.

ANALYTIC GEOMETRY AND GRAVITY FIELD SYMMETRY

Natural three-dimensional space curves are spherical and possess surface. A three-space surface curve can be made dynamic using Thales Right triangle hypotenuse applied as a spin diameter. Let the focal radius point to $(f\ (r))$ on the period time curve. $(r, f\ (r))$ is the orbit event diameter and the focal radius is the orbit energy curve. Using differential geometry curve framing will construct the spin diameter of an $(r, f\ (r))$ event. These orbit event curves using Thales Theorem, are **DEFINATIVE ASI** generating curves. These new **DEFINATIVE ASI** acceleration energy curves can be analyzed by study of their two-space profile. For the two-space profile content is composed by two curves. The independent curve 'mass/volume content' structuring the field **PRINCIPAL ASI** and the dependent motive energy time curve of a **DEFINITIVE ASI**. Once we have the profile of the field, we have a central relative frame of reference for observed mechanics of gravity fields.

<u>Reference Frame Postulate One:</u> A cross section of the three-space field surface, containing the spin axis, is a two-space interior map of the surface. This map is congruent everywhere with and indistinguishable from, any other cross section map containing the field spin axis.

Of all the diameters of an acceleration sphere, only one defines the principal axis.

Reference Frame Postulate Two: The principal axis is the field spin axis produced having three natural points. These points are Newtonian system center **F**, the vertex of rotation being North, and the vertex of rotation being South.

PROFILING A G-FIELD ORBITAL

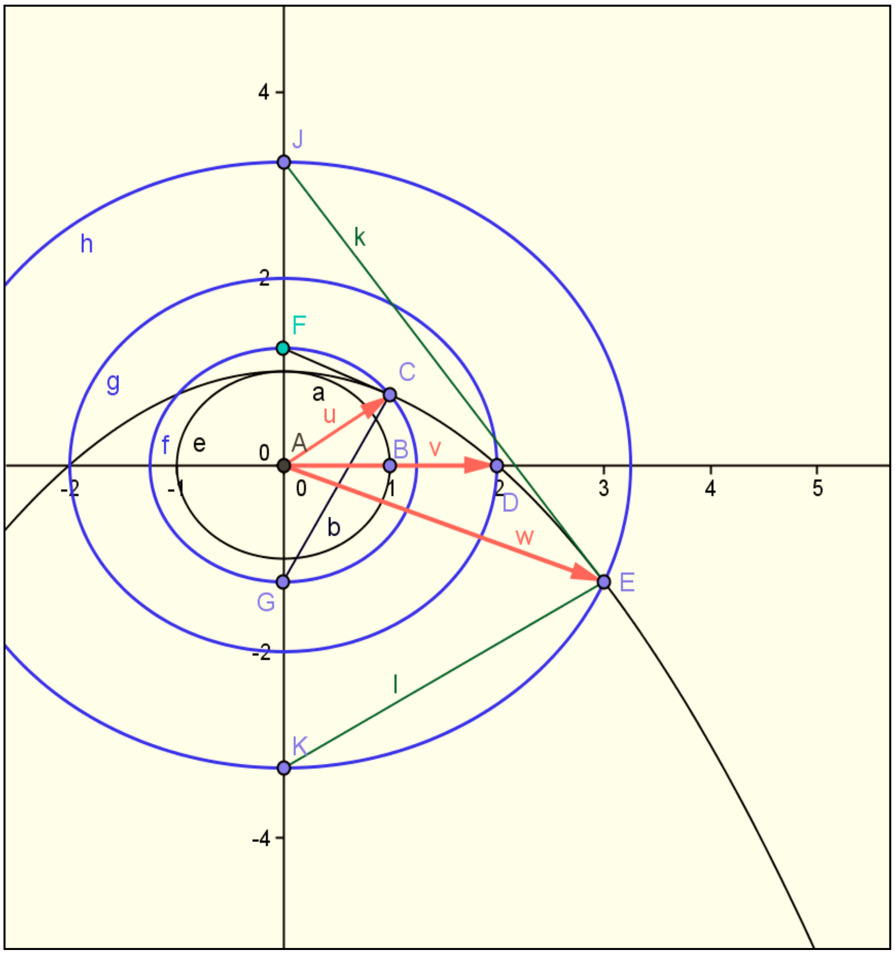


Figure 5: CSDA construction of stable M_1M_2 orbit configuration. High, low energy limits and average energy diameter of stable orbit system.

CHANGING FOCAL RADII ARE ENERGY CURVES.

If we let (C & E) be period limits of M_2 orbit motion, we see that focal radii grow outward from the central force **F** of the unit circle as *initial* curvature of consideration $(perihelion@C)$ toward radii of *final* curve of consideration $(aphelion@E)$. In the **CSDA**; focal radius (u) points to a right-angle vertex of curve framing for position analysis of point (C). Let focal radius (v) point to (D) as average energy diameter of M_1M_2 system and let focal radius (w) point to (E) as energy limit aphelion. These central force position vectors display expanding spherical energy wave forms of acceleration influence passing through (C) as a limiting energy curve changing velocity of period motion. The other limiting energy curve is found at (E).

Be it a stone tossed in water or expanding energy of a super nova, a focal radius follows moving, expanding, central force energy curves.

CONSIDERATION ONE: THE PRINCIPAL OF CENTRAL FORCE FIELD SYMMETRY. THE CLASSIC GEOMETRY FRAME OF REFERENCE DEPICTING EFFECTIVE PLANETARY MOTION BY THE THREE-SPACE GRAVITY FIELD CURVE OF OUR SUN IS A NATURAL FUNCTION EXHIBITED AS A DOUBLE CURVE STRUCTURE HAVING ONE AND ONLY ONE FOCUS AND CENTER. LET [**F**] BE CENTER OF OUR CENTRAL FORCE SYSTEM. THEN, THE INDEPENDENT CURVE HAS ONE CENTER [**F**] AND IS THE SPHERICAL LOCUS OF AN [PRINCIPAL **ASI**]. THE DEPENDENT CURVE HAS ONE FOCUS [**F**] AND IS THE PROFILE PARABOLA GENERATING CURVE OF A CENTRAL FORCE FIELD TIME AND ENERGY CURVE. PARABOLA POSITION VECTORS POINT TO $(f(r))$ AS (THALES) RIGHT TRIANGLE VERTEX CONSTRUCTING A [DEFINATIVE ASI] WITH RESPECT TO SPIN.

Definitions.

(PRINCIPAL **ASI**): an independent acceleration curve of influence. (M_1) potential energy.

Focal radii track changing motive event energy of $M_2\left(r, f(r)\right)$ on the parabola dependent curve. Focal radii point to the vertex of a right triangle on the time curve having central force spin diameter as hypotenuse, this curve shapes (DEFINATIVE **ASI**).

G-FIELD.ORBITAL. THEOREM 4: **ON QUANTIFYING ORBITAL ENERGY:** THE 2-SPACE PROFILE OF A PLANETARY ORBITAL IS A CURVED TIME DIAGONAL ACROSS A UNIT SQUARE SPACE TIME. THAT COMPONENT OF ORBIT MOTION *ALONG* THE DIAGONAL IS REQUIRED KINETIC ENERGY TO TRAVERSE 3-SPACE WITH RESPECT TO THE SPIN AXIS OF **F.** THAT COMPONENT OF MOTION *ACROSS* THE DIAGONAL IS THE CHANGING MOMENTUM OF 2-SPACE WITH RESPECT TO THE CENTRAL PROPERTIES OF **F.**

SUMMARY OF DEPENDENT **CSDA** FOCAL RADII

Focal radii are position vectors of **F** and point to orbit energy shaped on the field time curve. Focal radii end-point composing stable orbit motion on the time curve are composed with three-unit vectors of Frenet.

- Velocity and direction; into the paper.
- A unit vector pointing at acceleration sourced from **F**, co-incident with the focal radius.
- Torque; the mechanics shaping the Thales derived spin axis diameter of orbit energy curves of period motion.

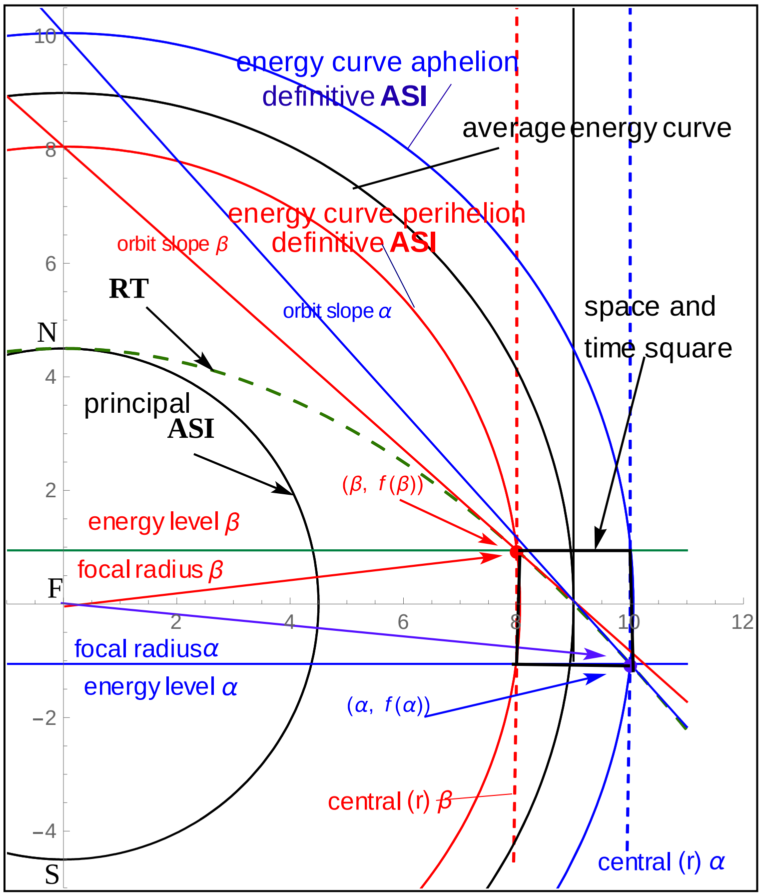


Figure 6: let system principal ASI be M_1 potential. All orbit energy curves on period time diagonal are CSDA definitive ASI.

Constructing a Space and Time Square.

A space-time square can be framed using period position limits and position energy limits.

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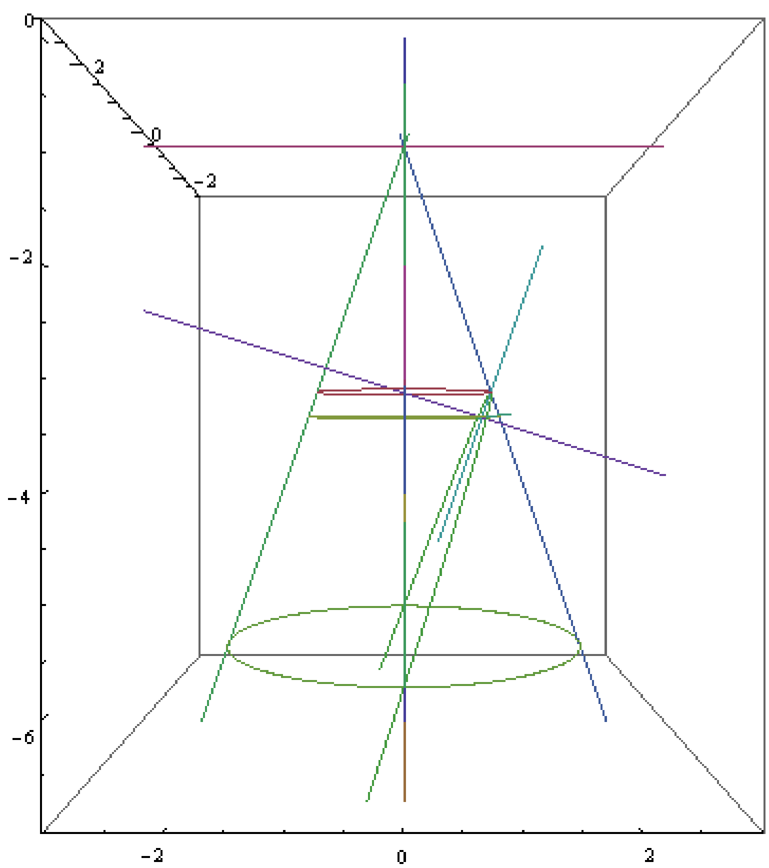
Sand Box Geometry LLC, a company dedicated to utility of Ancient Greek Geometry in pursuing exploration and discovery of Central Force Field Curves.

Using computer parametric geometry code to construct the focus of an Apollonian parabola section within a right cone.



"It is remarkable that the directrix does not appear at all in Apollonius great treatise on conics. The focal properties of the central conics are given by Apollonius, but the foci are obtained in a different way, without any reference to the directrix; the focus of the parabola does not appear at all... Sir Thomas Heath: "A HISTORY OF GREEK MATHEMATICS" page 119, book II.

The computer is my sandbox, the unit circle my compass, and the focal radius of the unit parabola my straight edge.

ALΣXANDΣR; CEO SAND BOX GEOMETRY LLC

The square space hypotenuse of Pythagoras is the secant connecting (π/2) spin radius (0, 1) with accretion point (2, 0). I will use the curved space hypotenuse, also connecting spin radius (π/2) with accretion point (2, 0), to analyze g-field energy curves when we explore changing acceleration phenomena.

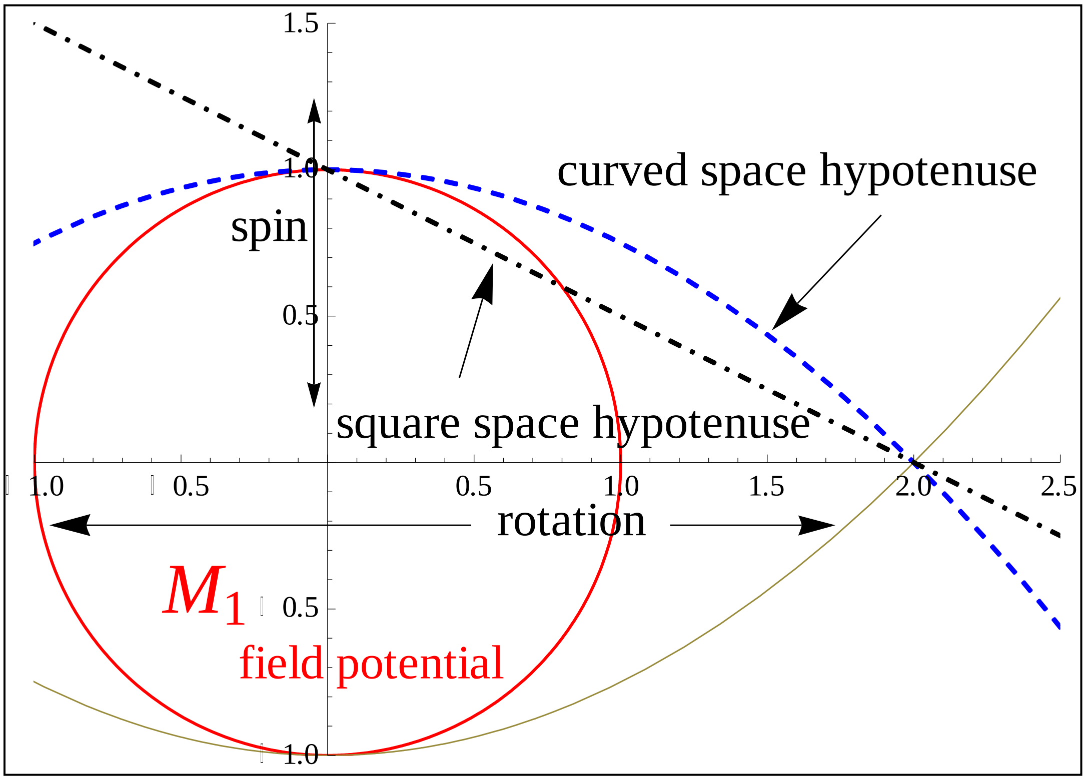


Figure 7: CSDA demonstration of a curved space hypotenuse and a square space hypotenuse together.

We have two curved space hypotenuse because the gravity field is a symmetrical central force, and will have an energy curve at the **N** pole and one at the **S** pole of spin ; just as a bar magnet. When exploring changing acceleration energy curves of M_2 orbits, we will use the N curve as our planet group approaches high energy perihelion on the north time/energy curve.

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