An elementary study of roots and exponents; and a Computer Based Math mechanical contrivance to construct rotation roots on a spinning central force field.

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If we want to learn how to construct mechanical energy curves of central force fields, it is necessary to learn the shaping phenomena of exponents in square space and curved space.

Constructing Roots on a Central Force Magnitude

April 7
2019

Gauss's fundamental theorem of algebra, simply stated, declares that a polynomial when zeroed out, will have a number of solutions determined by highest degree exponent. I construct a parametric geometry abscissa definition for 1st Quadrant root(s) of a specific central force magnitude. Then I provide two curved space solution curves to intercept abscissa definition of roots. The first place I need visit as a starting comparative of square space math, curved space math, discovery and Computer Based construction of roots of a Central Force Magnitude, has to be exponents and how they shape the space curves we live with.

Curves and lines of numbers and their exponents

INTENTIONS

I have been working with methods to construct G-field mechanical energy curves for 25 years.

I feel the only way to, analyze, construct, and see changing mechanical energy of the G-field is with Computer Based Geometry. Specifically, computer based parametric geometry using curves.

What better way to study curved space then with curves?

I invented a Curved Space Division Assembly so I could use curves to study curved space mechanical phenomena.

I found methods, using the same computer mechanical tool, to construct roots.

Constructing roots using curves is enlightening. I use the index (a) as a parametric exponent to construct solution curves for designated root of (b). $\left(\sqrt[a]{b}\right)$.

There will be two solution curves for (a^{th}) root radicand (b). $\left\{t, \frac{t^a}{\mp 2} \pm \frac{b}{2}\right\}$.

A CSDA is a central relative machine. Being so, I can study the two infinities of our being, working as one, side by side, kept separate by boundary of the independent curve system.

Parametric Central Relativity view of the Creation is a two-way street. On one end of this linear vision into space of our being is curvature. The other end is radius of curvature. Micro space infinity, the realm of curvature, and macro space infinity for radius, is the sight line connecting Creation with the human mind.

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Monograph 34 pages, 4800 words with *Mathematica.*

Using computer math (GeoGebra) to construct number line integer roots,
Sand Box Geometry
Saturday, February 15, 2020: 10:15AM - 12:00PM
Chickasaw Branch - Chickasaw - Meeting Room 2
Approved
Total cost for room $17.50 (paid)

All my roots of magnitude constructions begin with Euclid’s perpendicular divisor.

PowerPoint Informative (parametric upgrade for EUCLID’S $\perp$ divisor).
2013 MATHFEST, HARTFORD CONNECTICUT

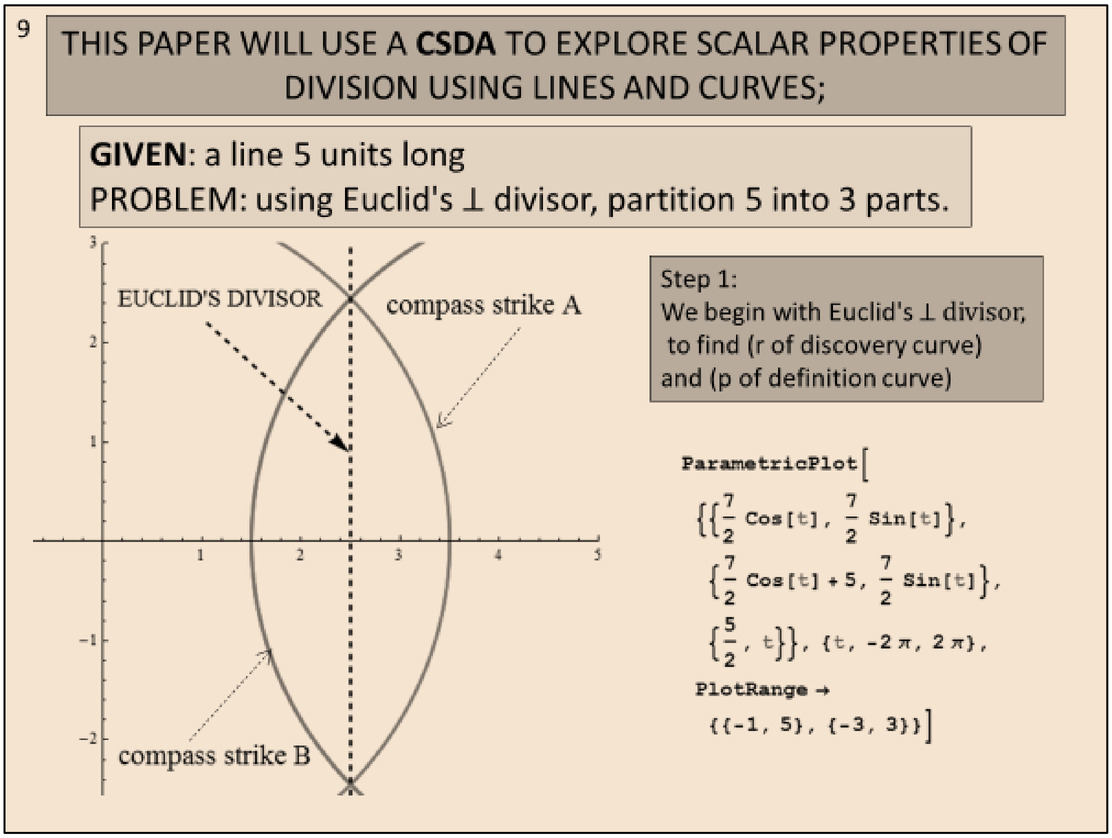


Figure 1; utility of Euclid’s Perpendicular Divisor: Step 1; set a compass greater than half considered magnitude. Step 2; set compass point on magnitude ends and strike arc (A) and (B). Step 3; use straight edge connection of arc intercepts to find midpoint of any magnitude.

We can now use computer based parametric geometry to construct $(\sqrt{2})$. After which I will post methods to construct roots of any magnitude.

I use basic computer technology to find and mark the place in/on the space defined by our linear number line with a root abscissa ID; then construct curved space intercept, confirming agreement between square space math and curved space math between root solution curves and abscissa ID.

Sand Box Geometry construction $\left(\sqrt[2]{2}\right)\ or\ \left(2^{\frac{1}{2}}\right)$.

$$\text{ParametricPlot}[\{\{\text{Cos}[t],\text{Sin}[t]\},\{t,\frac{t^2}{-4(1)}+1\},\{\sqrt{2},t\},\{t,\frac{t^2}{-2}+\frac{2}{2}\},\{t,\frac{t^2}{+2}-\frac{2}{2}\}\},\{t,-\pi,\pi\},\text{PlotRange}\rightarrow\{\{-3,3\},\{\frac{-3}{2},\frac{3}{2}\}\}]$$

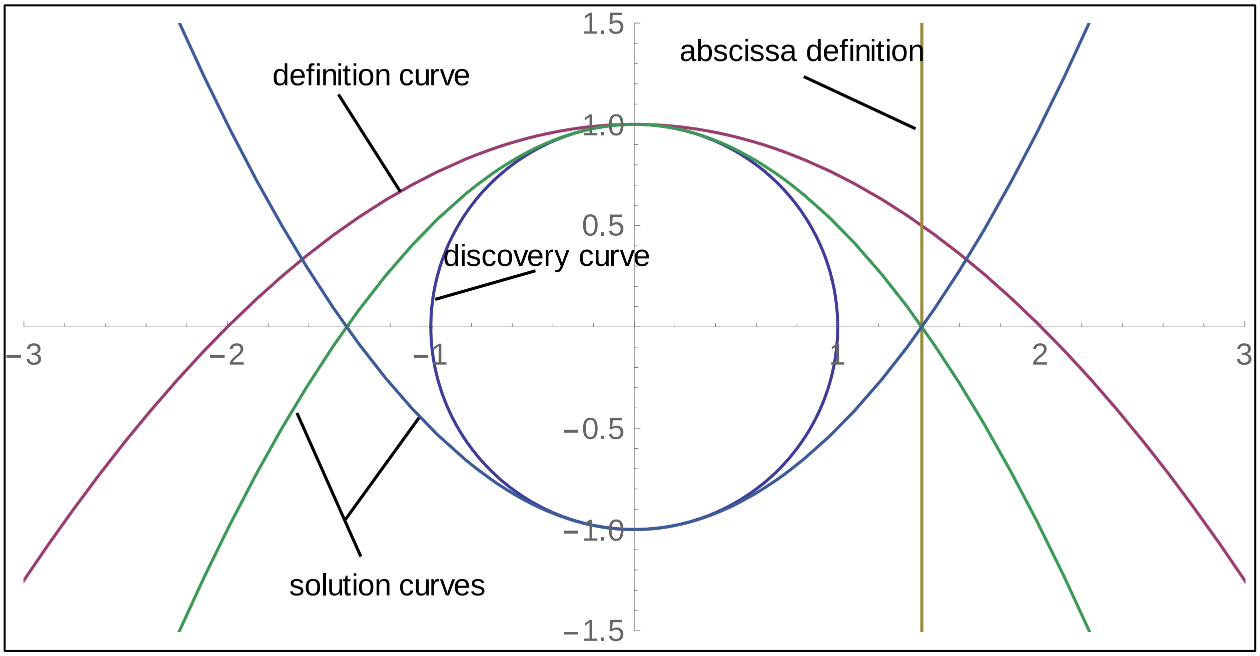
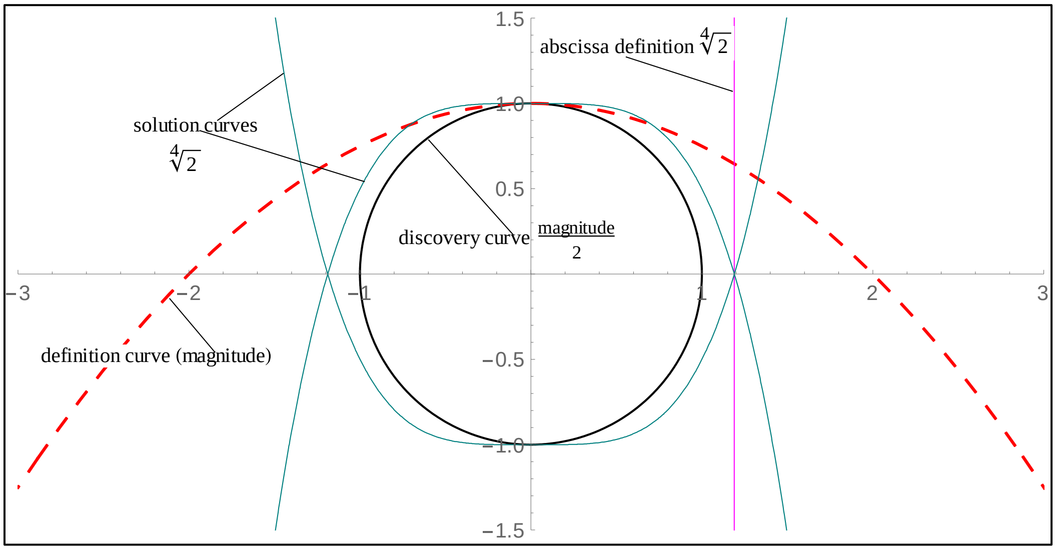


Figure 2: Curved Space Construction for $\sqrt{2}$. Abscissa definition is $\sqrt{2}$. Both solution curves intercept $\sqrt{2}$.

I call the unit circle and unit parabola a unit moniker, because the curves are constructed using a pre-determined unit of square space: (Euclid's magnitude/2).

Curved space construction of $\left(\sqrt[4]{2}\right)$; to see the changing shape of even indices solution curves.

$$\text{ParametricPlot}[\{\{\text{Cos}[t],\text{Sin}[t]\},\{t,\frac{t^2}{-4(1)}+1\},\{\sqrt[4]{2},t\},\{t,\frac{t^4}{-2}+\frac{2}{2}\},\{t,\frac{t^4}{+2}-\frac{2}{2}\}\},\{t,-\pi,\pi\},\text{PlotRange}\to\{\{-3,3\},\{\frac{-3}{2},\frac{3}{2}\}\}]$$



We see that *even* indices solution curves are parabolic shaped.

Figure 3: Curved Space Construction for $\sqrt[4]{2}$.

These are the methods to construct root of magnitude.

- Divide the considered magnitude by (2) to find the discovery radius. With the discovery radius construct a dependent parabola definition curve for magnitude.
- Independent (DISCOVERY) curve parametric description: $\left(\frac{magnitude}{2}\,Cos\,[t],\frac{magnitude}{2}\,Sin[t]\right)$.
- Dependent (DEFINITION) curve parametric description: $\left(t,\frac{t^2}{-4(p)}+r\right)$, where ($p$) = ($r$: $\frac{magnitude}{2}$) of discovery circle.
- Solution curves for roots of magnitude:

$$\{t,\left(t^{desiredrootindice}/\mp 2\right)\pm(magnitude/2)\}$$

Curved space construction of $(\sqrt[3]{8})$; to see the changing shape of solution curves

$$\text{ParametricPlot}[\{\{\frac{8}{2}\text{Cos}[t],\frac{8}{2}\text{Sin}[t]\},\{t,\frac{t^2}{-4\left(\frac{8}{2}\right)}+\frac{8}{2}\},\{t,\frac{t^3}{-2}+\frac{8}{2}\},$$
$$\{t,\frac{t^3}{+2}-\frac{8}{2}\},\{\sqrt[3]{8},t\}\},\{t,-3\pi,3\pi\},\text{PlotRange}\rightarrow\{\{-4,9\},\{-6,6\}\},$$

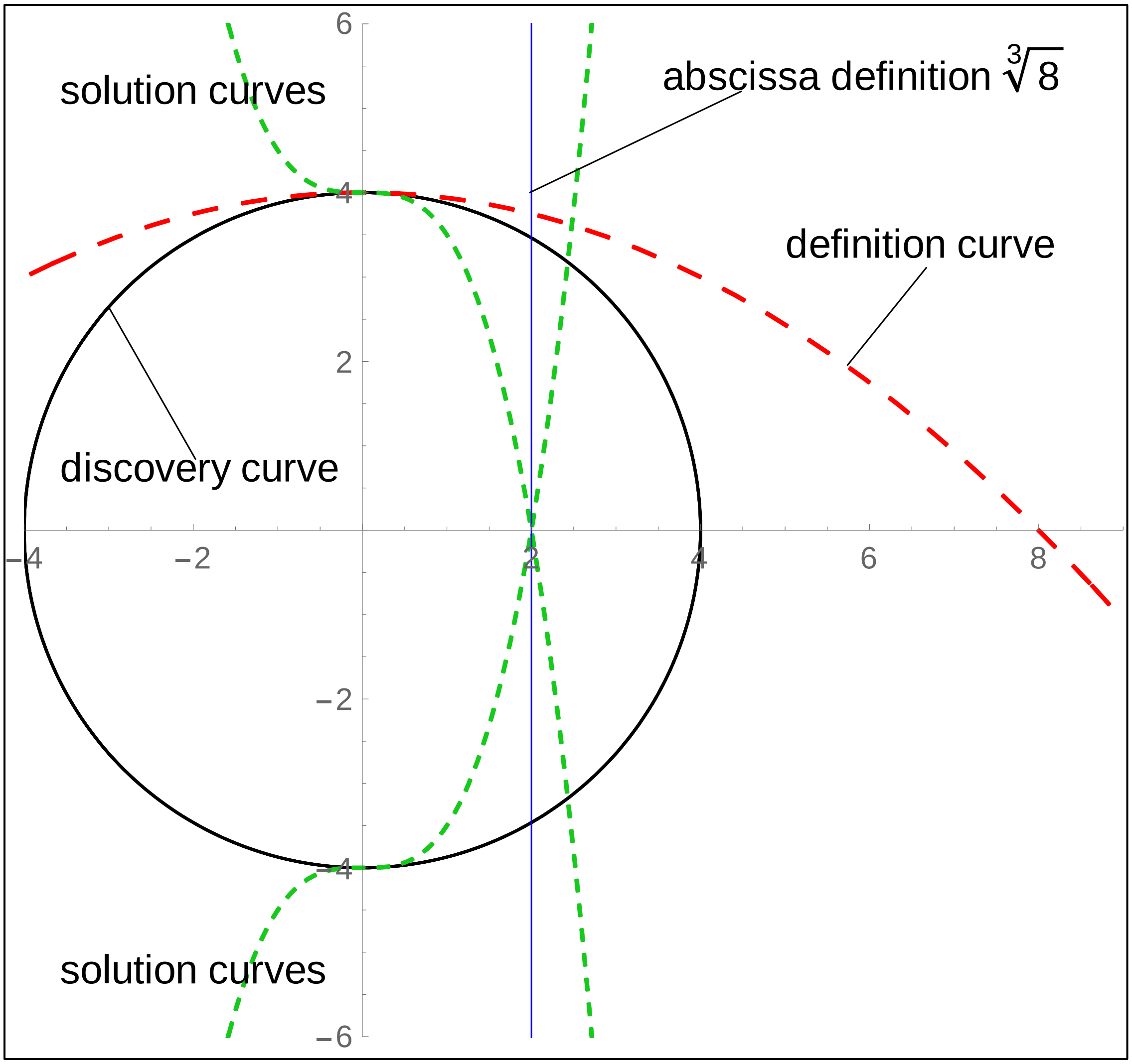


Figure 4: Curved Space Construction for $\sqrt[3]{8}$.

Curved space construction of $(\sqrt[5]{3})$; to see the changing shape of odd indices solution curves.

$$\text{ParametricPlot}[\{\{\tfrac{3}{2}\text{Cos}[t],\tfrac{3}{2}\text{Sin}[t]\},\{t,\frac{t^2}{-4\left(\frac{3}{2}\right)}+\frac{3}{2}\},\{t,\frac{t^5}{-2}+\frac{3}{2}\},\left\{t,\frac{t^5}{+2}-\frac{3}{2}\right\},$$
$$\{\sqrt[5]{3},t\}\},\{t,-3\pi,3\pi\},\text{PlotRange}\rightarrow\{\{-4,4\},\{-2,2\}\},\text{AxesOrigin}\text{->}\{0,0\}]$$

Note: solution curves always pass through independent $\left(\frac{\pi}{2};\ 90°; N\right)$ & $\left(\frac{3\pi}{2}; 270°; S\right)$ spin vertex of **CSDA** parametric geometry construction with flatline (zero slope). Square space math zero's a polynomial to find roots, curved space zeroes slope. The spin angles of a **CSDA** sphere are vertices N & S. N is (π/2), and S is $\left(\frac{3\pi}{2}\right)$.

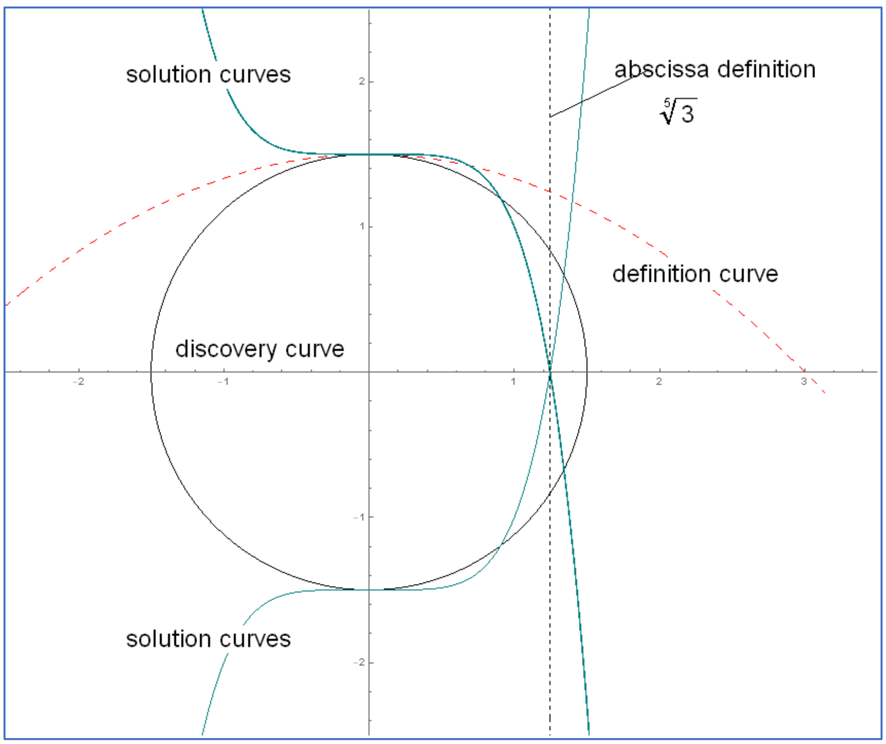


Figure 5: Curved Space Construction for $\sqrt[5]{3}$.

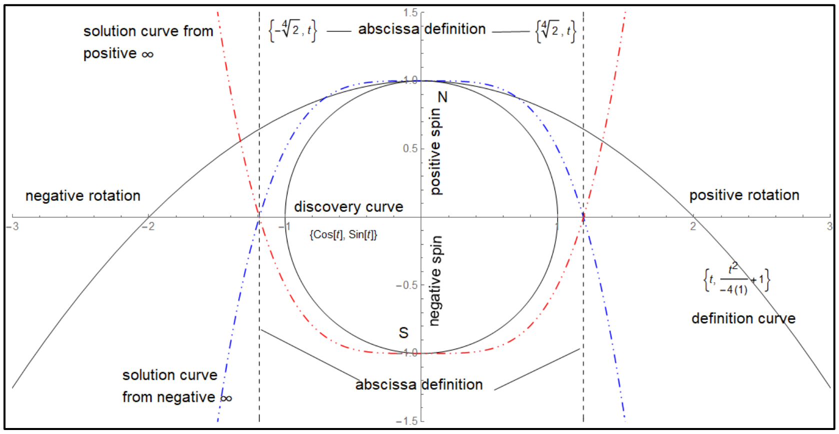
Rotation diameter end points also have definition. Rotation diameter of a **CSDA** is found as chord of the dependent parabola curve. Its parametric geometry name is the system Latus Rectum parabola chord with ends E & W. W is (π; 180°) and E is (0°or 2π; 360°).

These four radian angles are the only radian description used by the Sandbox.

<u>*Spin*</u>: N: (π/2 = 90°); S: $\left(\frac{3\pi}{2} = 270°\right)$. <u>*Rotation*</u>: W: (π = 180°); E: (0°or 2π; 360°).

EVEN INDICES $\sqrt[4]{2}$

$$\text{ParametricPlot}[\{\{\text{Cos}[t],\text{Sin}[t]\},\{t,\frac{t^2}{-4(1)}+1\},\{\sqrt[4]{2},t\},\{-\sqrt[4]{2},t\},\{t,\frac{t^4}{-2}+\frac{2}{2}\},\{t,\frac{t^4}{+2}-\frac{2}{2}\}\},\{t,-\pi,\pi\},\text{PlotRange}\to\{\{-3,3\},\{\frac{-3}{2},\frac{3}{2}\}\}]$$



even indices seem to favor two root abscissa ID. One on negative side of discovery curve and one on the positive side.

Figure 6: **CSDA** curved space construction of even indices for roots of magnitudes.

ODD INDICES: seem to favor root abscissa ID on the positive side of discovery spin.

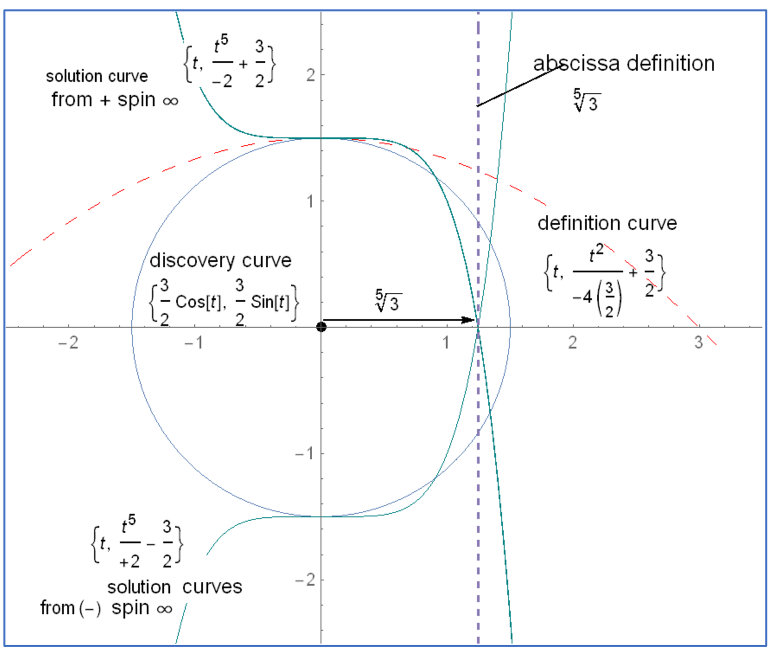


Figure 7: **CSDA** construction defining shape of odd indices.

on signing CSDA spin-rotation space:

Positive (y) is positive side of rotation.

Negative (y) is negative side of rotation.

Negative (x) is negative side of spin.

Positive (x) is positive side of spin.

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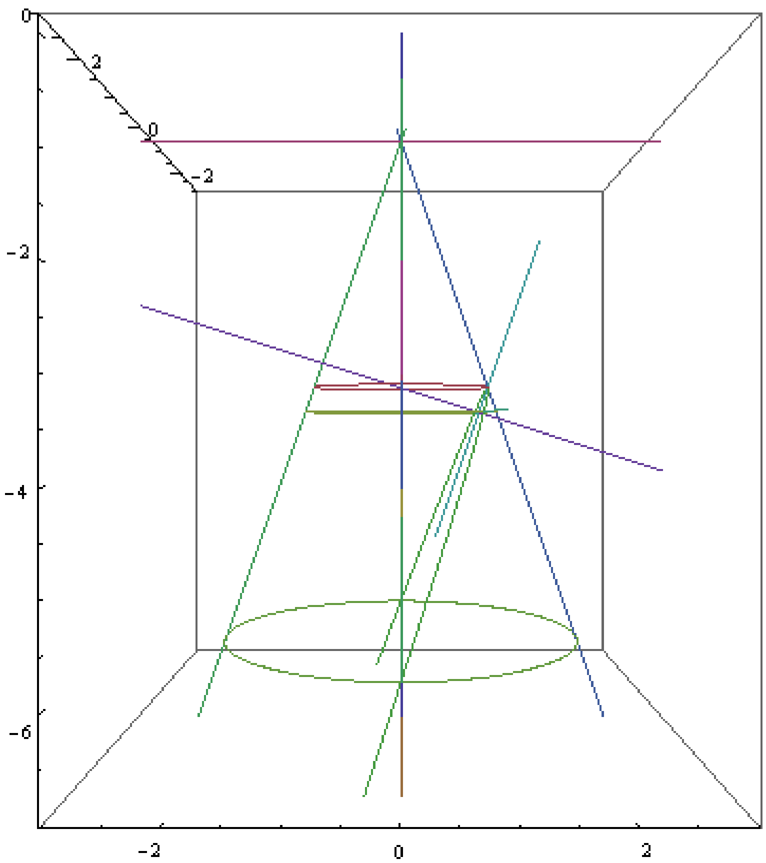
Sand Box Geometry LLC, a company dedicated to utility of Ancient Greek Geometry in pursuing exploration and discovery of Central Force Field Curves.

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.

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

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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.

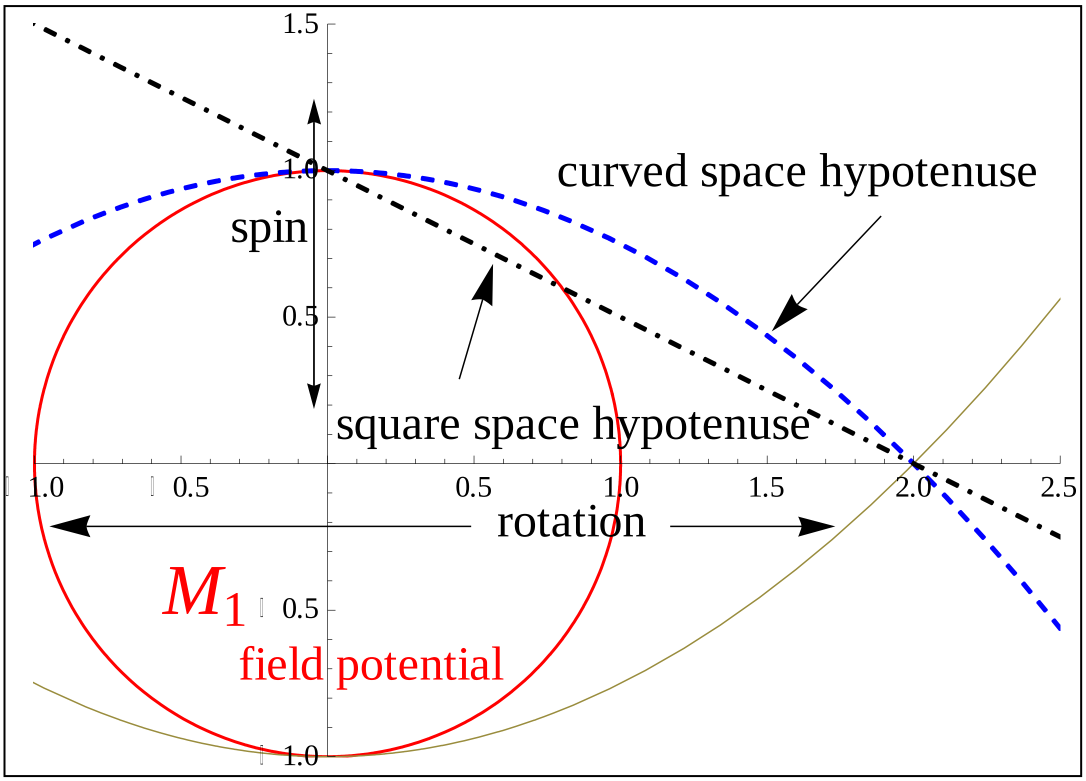

Figure 8: CSDA demonstration of a curved space hypotenuse and a square space hypotenuse together.

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.

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