Constructing roots of Cartesian domain integers.

ALΣXANDΣR; CEO SAND BOX GEOMETRY LLC

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

The science of curved space parametrics. A STEM accelerator	November 28 2021

A parametric tool for curved space analytics of SCALAR Cartesian number line square space math.

A presentation of exponents and roots. Changing the shape of space.

Began: Sunday, November 28, 2021.01:13.

On written symbols and digital code for roots and exponents..

Exponents are straight forward $(number^{exponent})$. Roots have an alternate script and symbol. Given we know the $(3^3 = 27)$. We also recognize $(\sqrt[3]{27} = 3)$ but not so often used is the written exponent for $(\sqrt[3]{27})$; $\left(27^{\frac{1}{3}} = 3\right)$. Note the inverse of exponent (3) in the examples is cube root or $\left(\frac{1}{3}\right)$. Using inverse exponents eliminates the radical.

There are three elements in the parametric geometry of roots: index; radical; and radicand. $\sqrt[index]{radicand}$.

We never include the index when writing square roots. Why? Don't know! Anyway, the correct written term for square root of 4 is: $(\sqrt[2]{4} = 2)$. When constructing curved space solution roots on the Descartes domain number line we reference the index and radicand to construct required solution curves.

We also have seldom seen exponents.

$$(n^0 = 1);\ (n^1 = n)$$

Setting these exponents (0 and 1) at index:

$(\sqrt[1]{n}) = n,$ and $(\sqrt[0]{n}) = \frac{1}{0}$encountered or indeterminate infinity). When I was in school, simply forbade a (0) denominator now we claim?? Curved space parametric geometry will provide a construction of $(\sqrt[0]{n})$.

USING A (CSDA©) TO CONSTRUCT ROOTS OF MAGNITUDE:

PROBLEM1: Construct the $\sqrt[2]{\mathbf{2}}$:

I will use a Euclidean perpendicular divisor to find exact and precise median of magnitude. The median will provide the radius of the unit circle with which to build the unit parabola. As in calculus, I will use methods that "flex" a curve by changing the definition curve *exponent*. In so doing I will cause the definition curve to intercept the Latus Rectum number line at the desired root of linear magnitude.

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

PowerPoint Informative (parametric upgrade for EUCLID'S ⊥ divisor).
2013 MATHFEST, HARTFORD CONNECTICUT

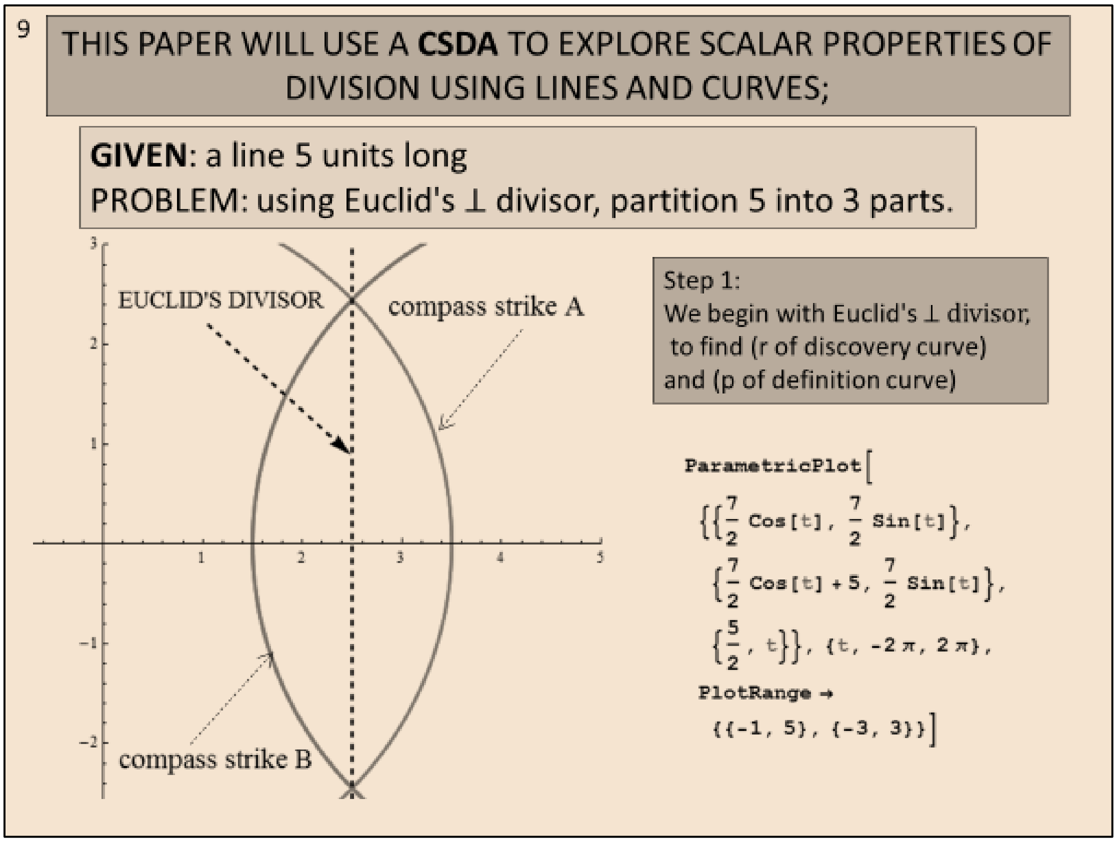


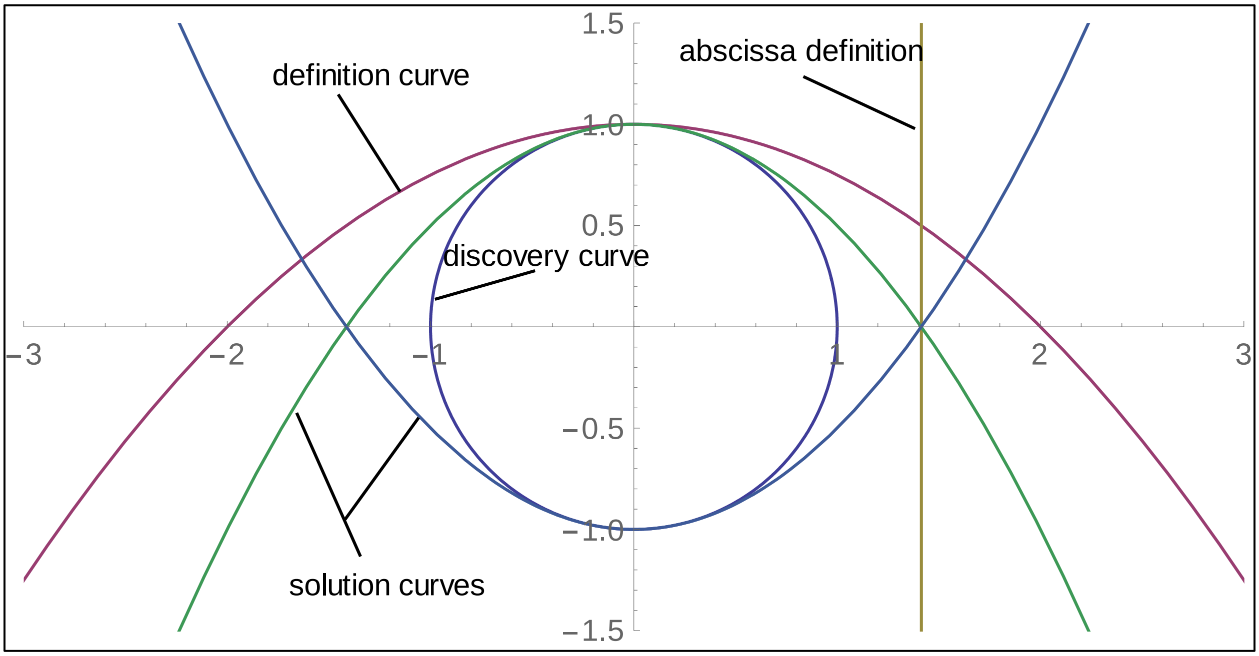
Figure 1; utility of Euclid's Perpendicular Divisor: Step 1; set a compass greater than half considered magnitude. Step 2; set compass point on magnitude ends and strike arc (A) and (B). Step 3; use straight edge connection of arc intercepts to find midpoint of any magnitude.

I change moniker of independent curve to discovery and dependent curve to definition.

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 construct the desired root on our 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 $(\sqrt[2]{2})$ or $\left(2^{\frac{1}{2}}\right)$.



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).

These are the methods to construct roots 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:

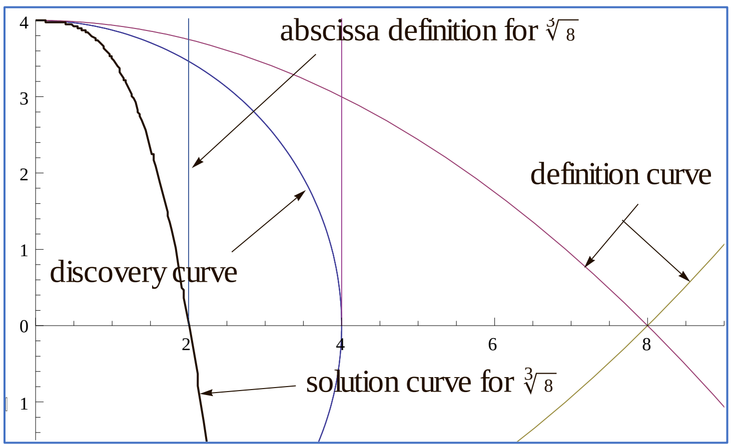
$$\{t, \left(t^{desiredrootindice} / \mp 2\right) \pm (magnitude/2)\}$$

Parametric geometry means to construct $(\sqrt[3]{8})$.

Sand Box Geometry Demonstration on roots of magnitude; construct$(\sqrt[3]{8})$.

$$\text{ParametricPlot}[\{\{\frac{8}{2}\text{Cos}[t],\frac{8}{2}\text{Sin}[t]\},\{t,\frac{t^2}{-4\left(\frac{8}{2}\right)}+\frac{8}{2}\},\{t,\frac{t^2}{+4\left(\frac{8}{2}\right)}-\frac{8}{2}\},$$

$$\{t,\frac{t^3}{-2}+\frac{8}{2}\},\{\sqrt[3]{8},t\},\{4,t\}\},\{t,0,6\pi\},\text{PlotRange}\rightarrow\{\{0,9\},\{\frac{-3}{2},4\}\},$$



Proof that the solution curves are at$(\sqrt[3]{8})$.

We see $\{t \rightarrow 2\}$is one of the roots.

$$\text{Solve}\left[\frac{t^3}{-2}+\frac{8}{2}==\frac{t^3}{+2}-\frac{8}{2},t\right]\xrightarrow{yields}$$

$$\{\{t\rightarrow 2\},\{t\rightarrow -2(-1)^{1/3}\},$$

$$\{t\rightarrow 2(-1)^{2/3}\}\}$$

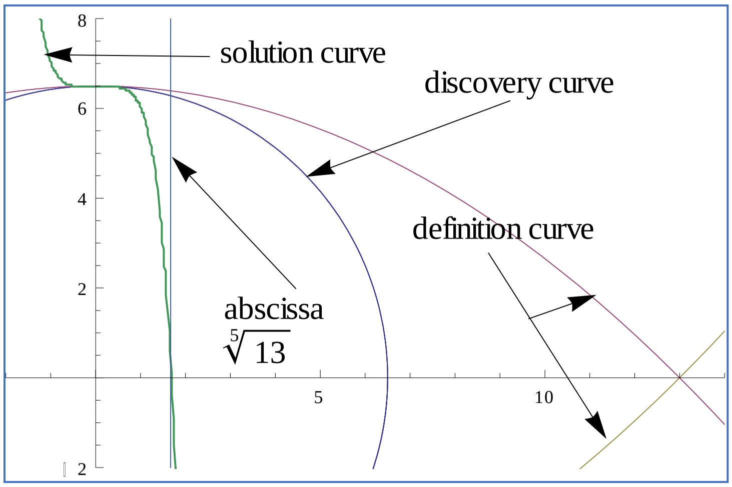
I reject other root solutions as I am only interested in 1st quad positive intercept of number line domain.

My last demonstration will be to construct: $(\sqrt[5]{13})$.

The parametric description will be:

$$\text{ParametricPlot}[\{\{\frac{13}{2}\text{Cos}[t],\frac{13}{2}\text{Sin}[t]\},\{t,\frac{t^2}{-4\left(\frac{13}{2}\right)}+\frac{13}{2}\},\{t,\frac{t^2}{4\left(\frac{13}{2}\right)}-\frac{13}{2}\},$$

$$\{t,\frac{t^5}{-2}+\frac{13}{2}\},\{\sqrt[5]{13},t\}\},\{t,-2,6\pi\},\text{PlotRange}\rightarrow\{\{-2,14\},\{-2,8\}\}]$$



The Curved Space Division Assembly construction for the $(\sqrt[5]{13})$.

Proof that the solution curves are the fifth root of 13.

$$\text{Solve}[\frac{t^5}{-2}+\frac{13}{2}==\frac{t^5}{+2}-\frac{13}{2},t]\xrightarrow{yields}\{\{t\rightarrow-(-13)^{1/5}\},\{t\rightarrow13^{1/5}\},$$

$$\{t\rightarrow(-1)^{2/5}13^{1/5}\},\{t\rightarrow-(-1)^{3/5}13^{1/5}\},\{t\rightarrow(-1)^{4/5}13^{1/5}\}\}$$

We see that one solution is $(t\rightarrow 13^{1/5})$, proof complete…Alexander

END CSDA© MATH OPERATIONS: DIVISION AND ROOTS OF MAGNITUDE. Alexander

Parametric geometry construction for $(\sqrt[2]{9})$.

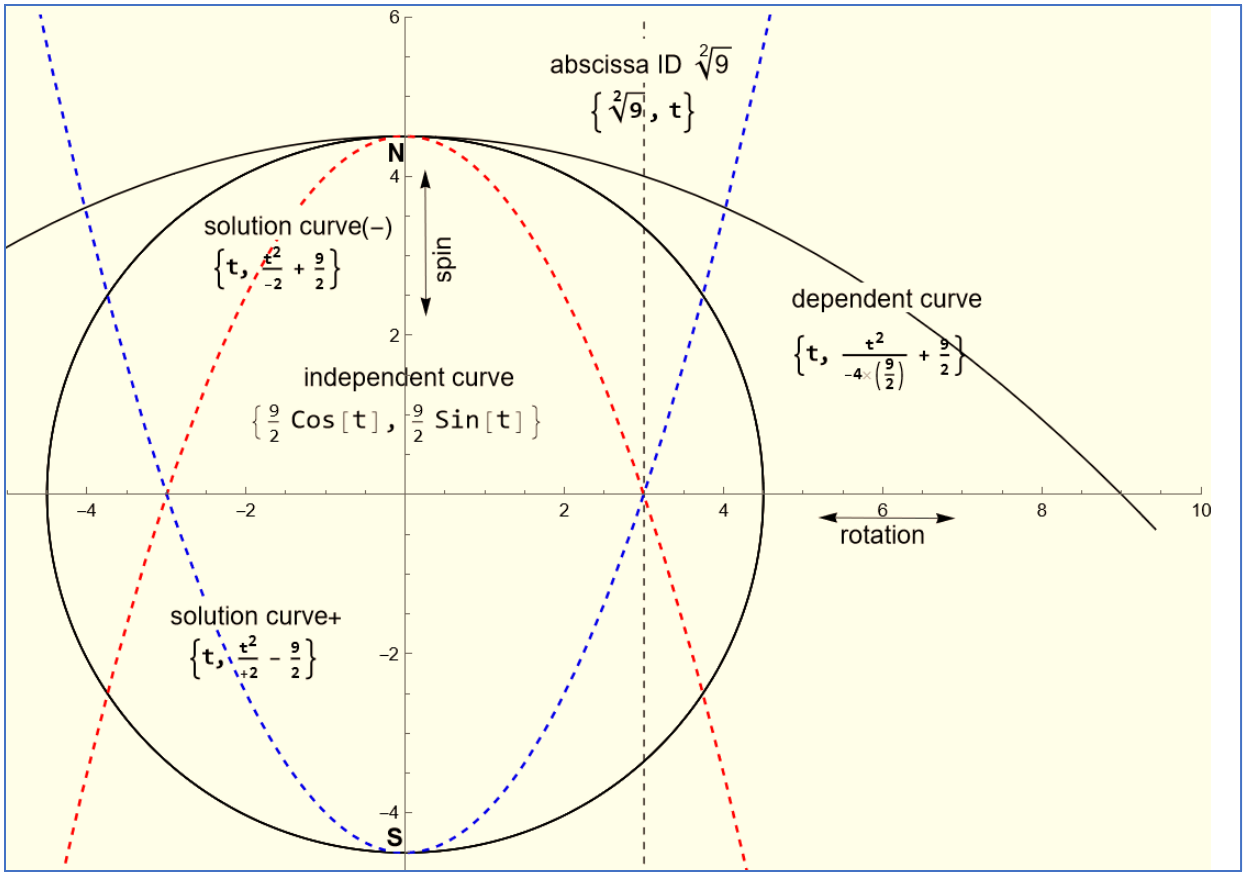


Figure 2: square space and curved space finding $(\sqrt[2]{9})$.

Geography of a **CSDA**.

I analyze curved space mechanics. I use computer constructions to explore Central Force Mechanics. A central force system is a spinning rotating nebulous object. Gravity and nuclear electron cloud are examples.

Take our Sun. It is clearly bright and there. However, as the M_1 G-field participant, its potential for control of all its little M_2's is what makes Gravity a mathematical descriptive, cloning motion of planets onto paper so we humans can predict physical resultant properties of G and how it works.

I begin explanation of methods with the geography and parametric construction of $\left(\sqrt[2]{2}\right)$. picture the following CSDA as a spinning ^{1}H atom. The small (1) to the left of (H) defines this hydrogen atom as protium, element 1 of the periodic table.

Keeps my construction simple. One proton as nucleus (origin) one electron cloud, as independent curve. The dependent curve defines the number (2) on the ^{1}H plane of rotation. Let's construct the $\left(\sqrt[2]{2}\right)$ on the rotation plane of ^{1}H.

Our atom:

$$\text{ParametricPlot}[\{\{1\text{Cos}[t]+0, 1\text{Sin}[t]+0\}, \{t, t^2/(-4)+1\}\}, \{t, \frac{-2}{2}\pi, \frac{2}{2}\pi\}, \text{PlotRange} \to \{\{-2, \frac{9}{2}\}, \{\frac{-2}{2}, \frac{3}{2}\}\}]$$

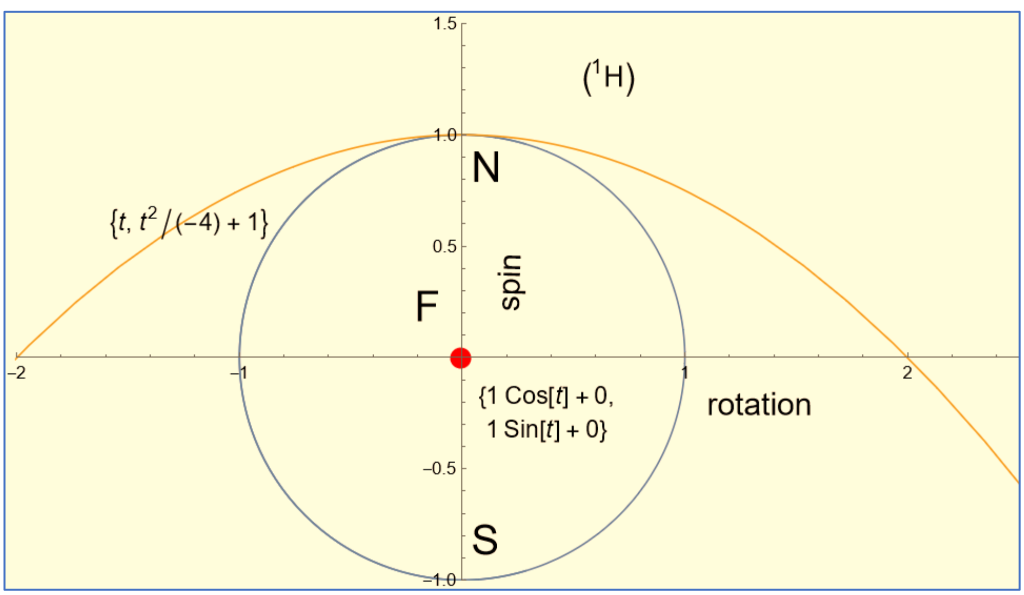


Figure 3: a **CSDA** parametric construction of Protium

Now to construct the $\left(\sqrt[2]{2}\right)$ on to the rotation plane of Protium, the building block of the universe.

My CSDA is a curved space analytic tool. A spinning Central Force Field. We have a South and North pole spin axis. We have a plane of rotation. It is a 3D object. The roots I have constructed, if made dynamic would be an open cylinder enclosing Protium. Probably also spinning.

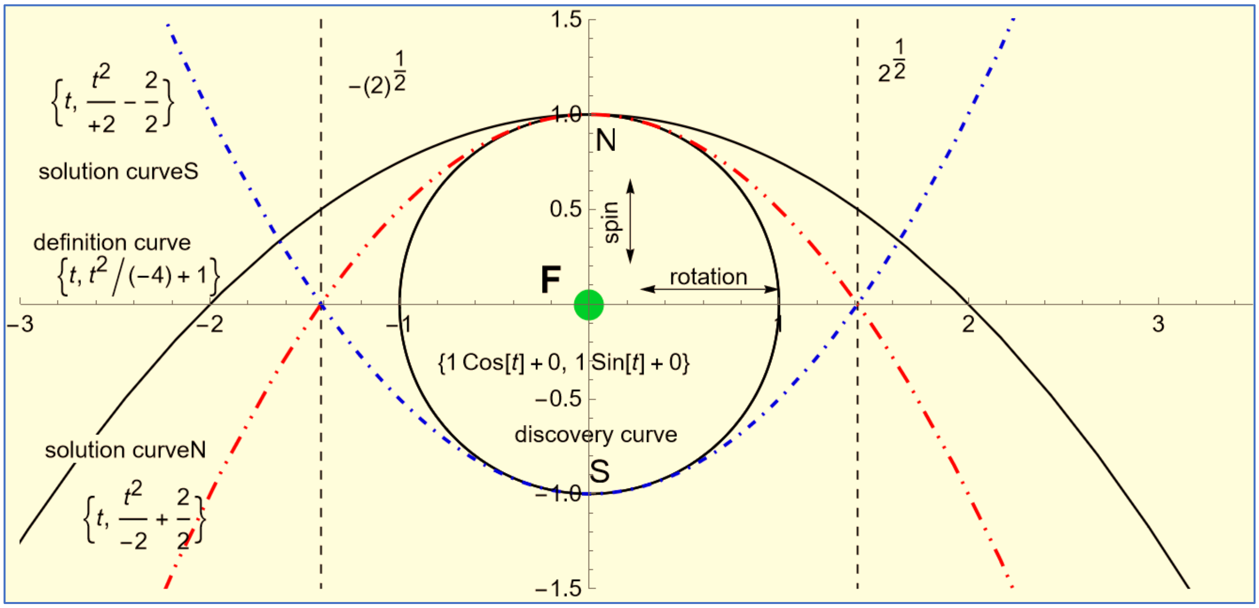


Figure 4: a **CSDA** parametric construction for $\left(\sqrt[2]{2}\right)$. Square space abscissa ID and two Curved Space solution curves.

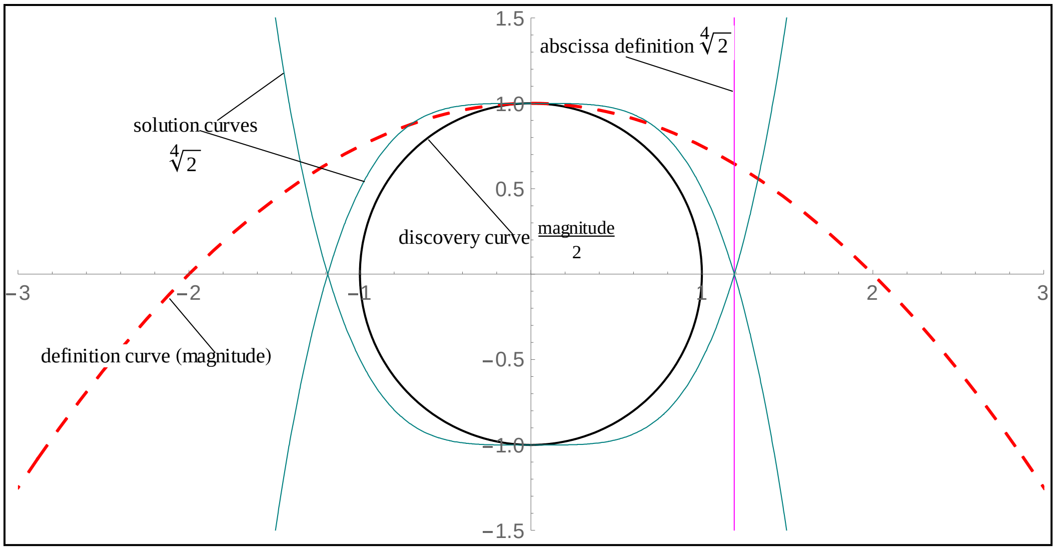
When using a SBG **CSDA** to discover integer roots of curved space I use different monikers. Let the independent curve be the discovery curve and the dependent curve be integer definition curve.

I assign negative and positive slope to solution curves. I base sign of slope on pole entry and slope of solution curve intercept with square space abscissa ID of desired root happening @ Quad 1&4.. The $(-)$ solution curve enters the N pole, flatlines at spin vertex and dives to integer selected. The $(+)$ curve enters with the south pole, flatlines at spin vertex and climbs the desired root.

The $(-)$ solution curve is (red), The $(+)$ curve is navy.

Curved space construction of $(\sqrt[4]{2})$; to see the changing shape of <u>even</u> 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 *<u>even</u>* indices solution curves are parabolic shaped.

Figure 5: Curved Space Construction for $\sqrt[4]{2}$.

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

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

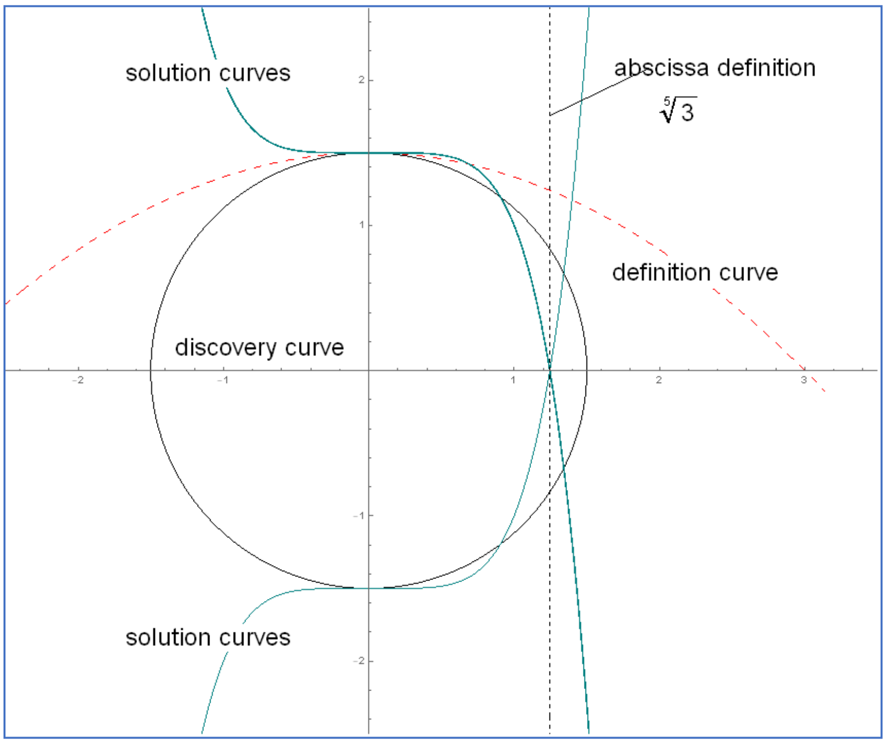


Figure 6: Curved Space Construction for $\sqrt[5]{3}$.

Note: solution curves always pass through independent $\left(\frac{\pi}{2};\ 90°;N\right)$ & $\left(\frac{3\pi}{2};270°;S\right)$ spin vertices 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 $\left(\frac{3\pi}{2}\right)$.

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.

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

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

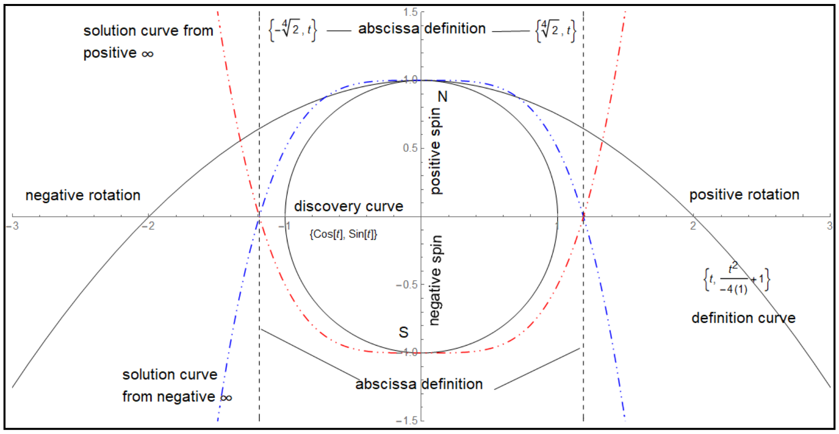


Figure 7: **CSDA** curved space construction of even indices for roots of magnitudes.

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

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

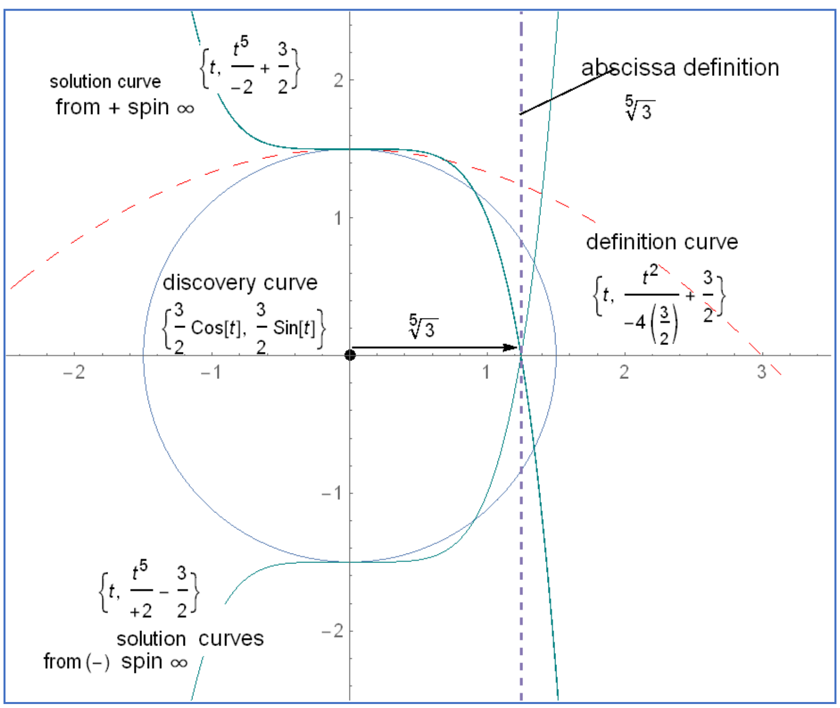


Figure 8: **CSDA** construction defining shape of odd indices.

on signing CSDA spin-rotation space:

($\pi/2 = 90°$): Positive (y) is positive spin sourced from positive side of accretion domain of **F**.

$\left(\frac{3\pi}{2} = 270°\right)$: Negative (y) is negative spin sourced from negative side of accretion domain of **F**.

($\pi = 180°$): Negative (x) is negative side of accretion.

($0°$or 2π; $360°$): Positive (x) is positive side of accretion.

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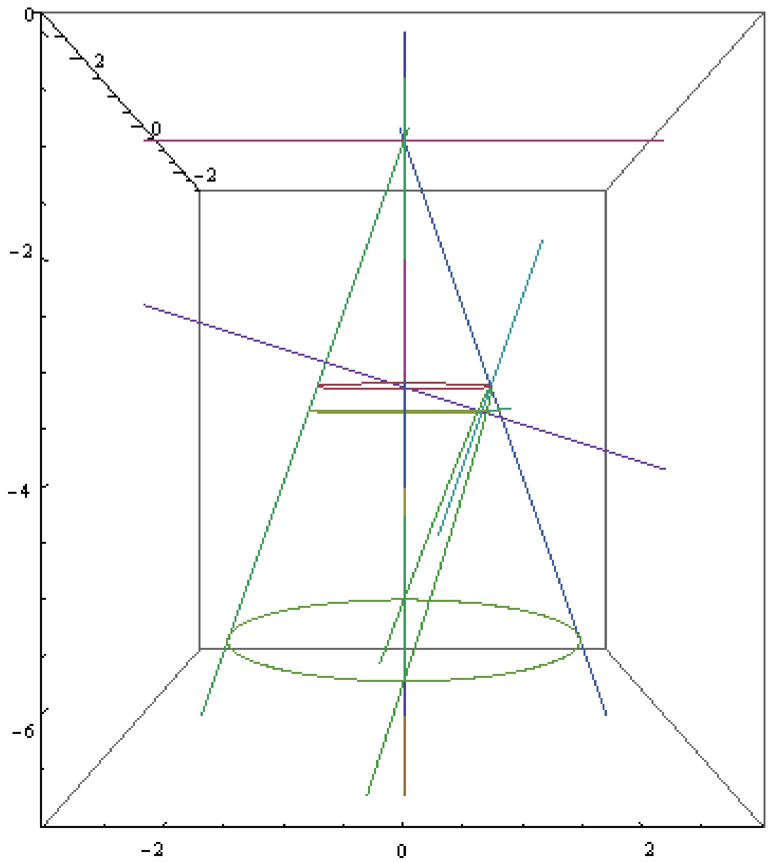
Sand Box Geometry LLC, a company dedicated to utility of Ancient Greek Geometry in pursuing exploration and discovery of Central Force Field Curves.

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

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 energy curves when we explore changing acceleration phenomena of Gravity.

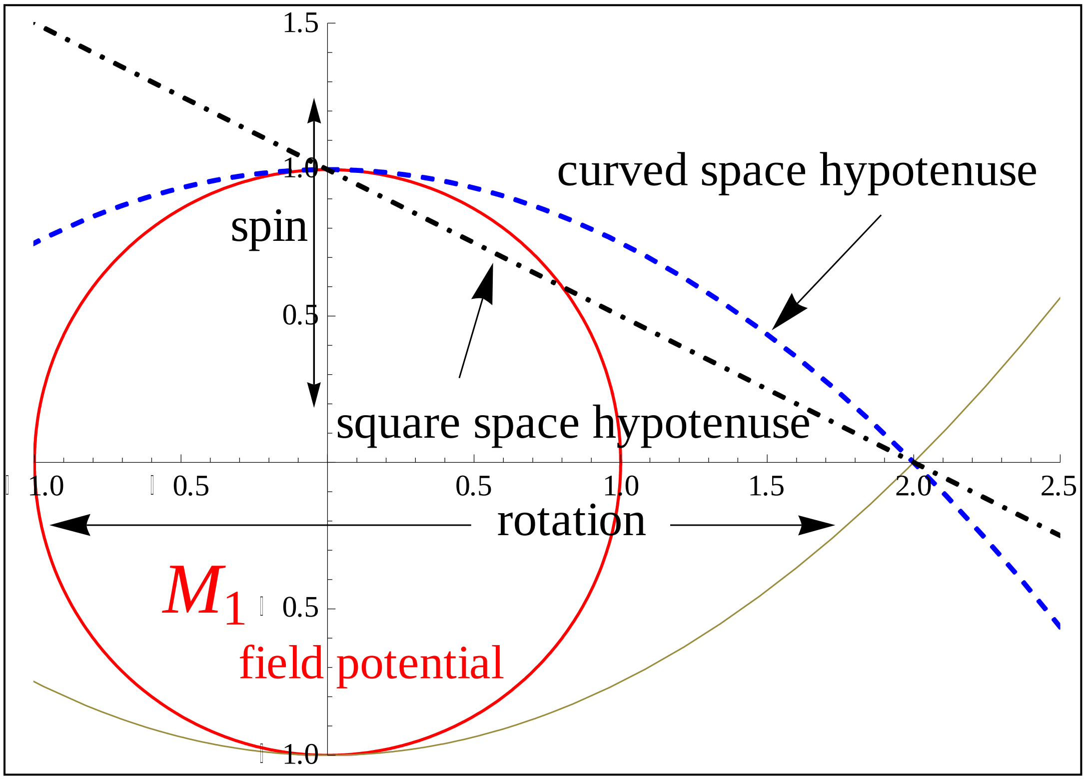


Figure 9: CSDA demonstration of a curved space hypotenuse and a square space hypotenuse together.

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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