Warp Navigation

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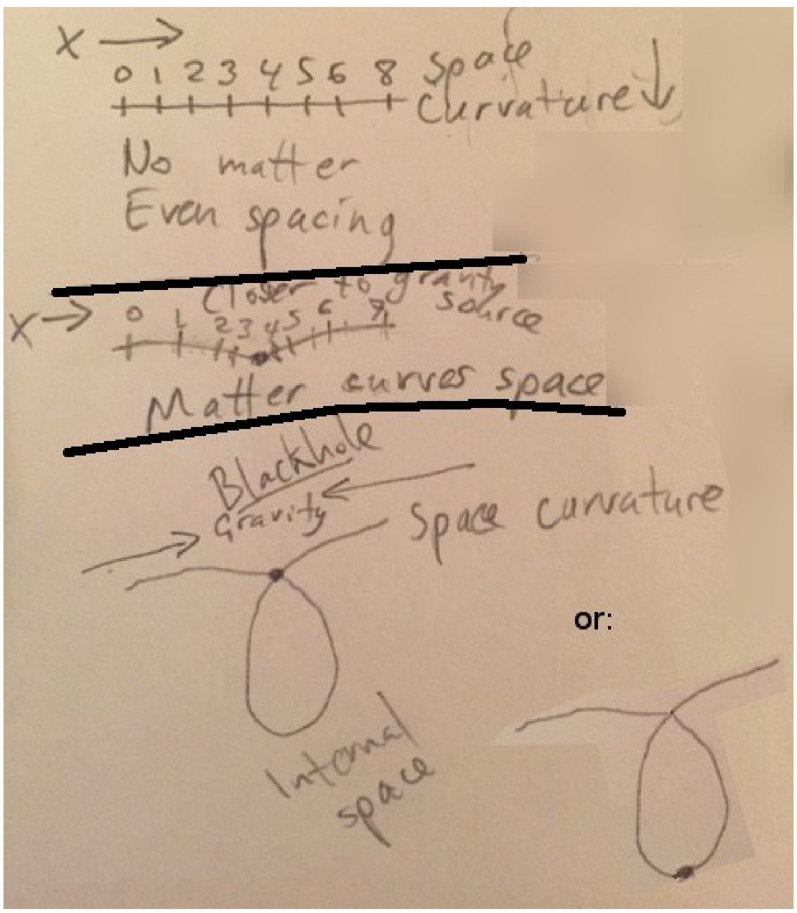
I propose the hypothesis that blackholes have an internal space due to the warping of the fabric of spacetime. I also attempt to demonstrate what happens to an infalling probe and what can be done to possibly navigate inside to travel in time.

Previous work by Poplawski attempts to demonstrate that matter cannot be compressed indefinitely and bends out or rebounds like a string[1] in a new direction.

Do blackholes have an internal space? Consider the diagram. Inside the negative space, a "bubble" of sealed space, matter is free to move.



What must we show to confirm the hypothesis? Given a coordinate x with respect to a mass, the change in x with respect to x must show that there's an internal space where x is both accelerating (toward gravity source) and standing still, or moving elsewhere.

Let us start with the force of gravity law. This is interpreted to mean the natural trajectory of an object attracted to a gravity source, following the natural curvature of space-time.

$F = G m1 m2 / r^2$

where:

F is the force between the masses;
G is the gravitational constant (6.674×10^{-11} N $(m/kg)^2$);
m1 is the first mass;
m2 is the second mass;
r is the distance between the centers of the masses.

Given negative radius (internal radius), we might get an internal space coordinate.

The equation is held to be a description of relativistic forces and laws of the course of nature that holds true beyond the initially intended use case – a new interpretation. It will later be shown that there is a part of the result of the equation that is ignored as meaningless data after a certain reasonable limit, which I propose has meaning.

Combining this with the equation of motion:

$x = x0 + v0\, t + ½\, a\, t^2$

where:

x is the coordinate of space
x0 is the initial coordinate
v0 is the initial velocity
t is the time at which the the object is expect to be at coordinate x
a is the acceleration

We get:

$a = F/m$

$x = x0 + v0\, t + ½\, t^2\, F/m1$

$x = x0 + v0\, t + ½\, t^2\, G\, m2 / r^2$

Note: the acceleration is not constant throughout the trajectory and changes as we get closer, so we must integrate over the interval t to determine the position:

dx/dt = v0 + t int from {0} to {t} da(t) dt

Computing the derivative of acceleration:

$a = F/m$

$a = G\, m2 / r^2$

$r = (x2 - x)$ for $x2 > x0$

$$a = G m_2 / (x_2 - x)^2$$

Where:

x_2 is the coordinate of the mass source

The derivative of acceleration as a function of time is thus:

$$a'(t) = d(G m_2 / (x_2 - x)^2)/dt$$

Although I haven't worked out the math completely, because x is dependent on time and acceleration itself it would involve higher math, we only need an approximation.

$$x(t) = \int_{0}^{t} dx/dt$$

$$x(t) = x_0 + \int_{0}^{t} \left(v_0 + t \int_{0}^{t} da(t)\, dt \right) dt$$

$$x(t) = x_0 + \int_{0}^{t} \left(v_0 + t \int_{0}^{t} \left(d(G m_2 / (x_2 - x)^2)/dt * dt \right) \right) dt$$

This does not give the right information for acceleration quite. The integral only gives the acceleration at time t. And we must continue adding derivatives.

A better try is:

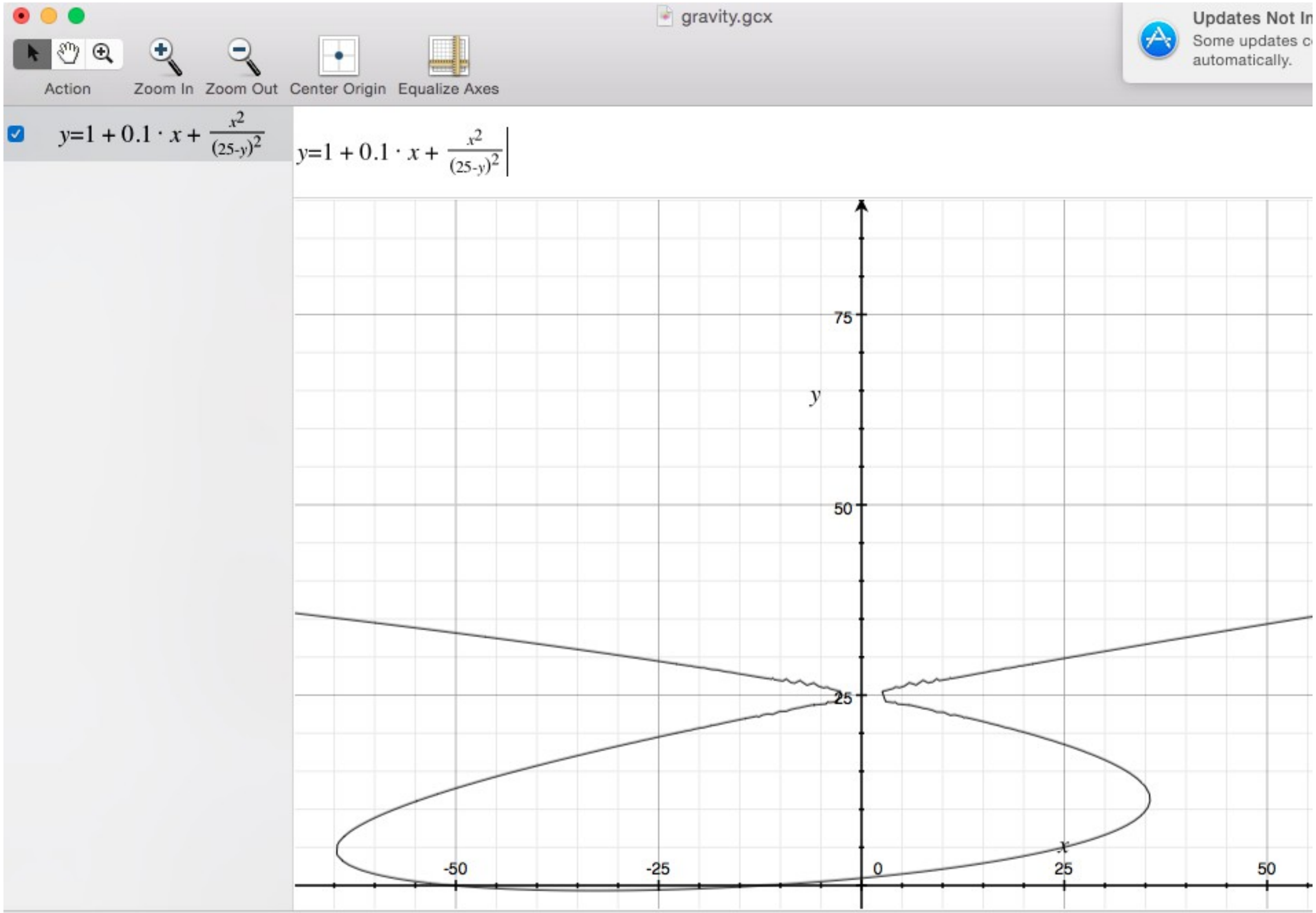
$$x = x_0 + v_0 t + \tfrac{1}{2} a t^2 + 1/6\, c t^3 + 1/12\, d t^4$$

Where c is jerk and d is the derivative of jerk. We can continue like this indefinitely. We can gain a better and better approximation by continuing the Taylor expansion until we get a negligible value.

Graphing the form

$$x = x_0 + v_0 t + \tfrac{1}{2} t^2 G m_2 / (x_2 - x)^2$$

Gives:


gravity.gcx
Action
Zoom In
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$y=1+0.1\cdot x+\frac{x^2}{(25-y)^2}$
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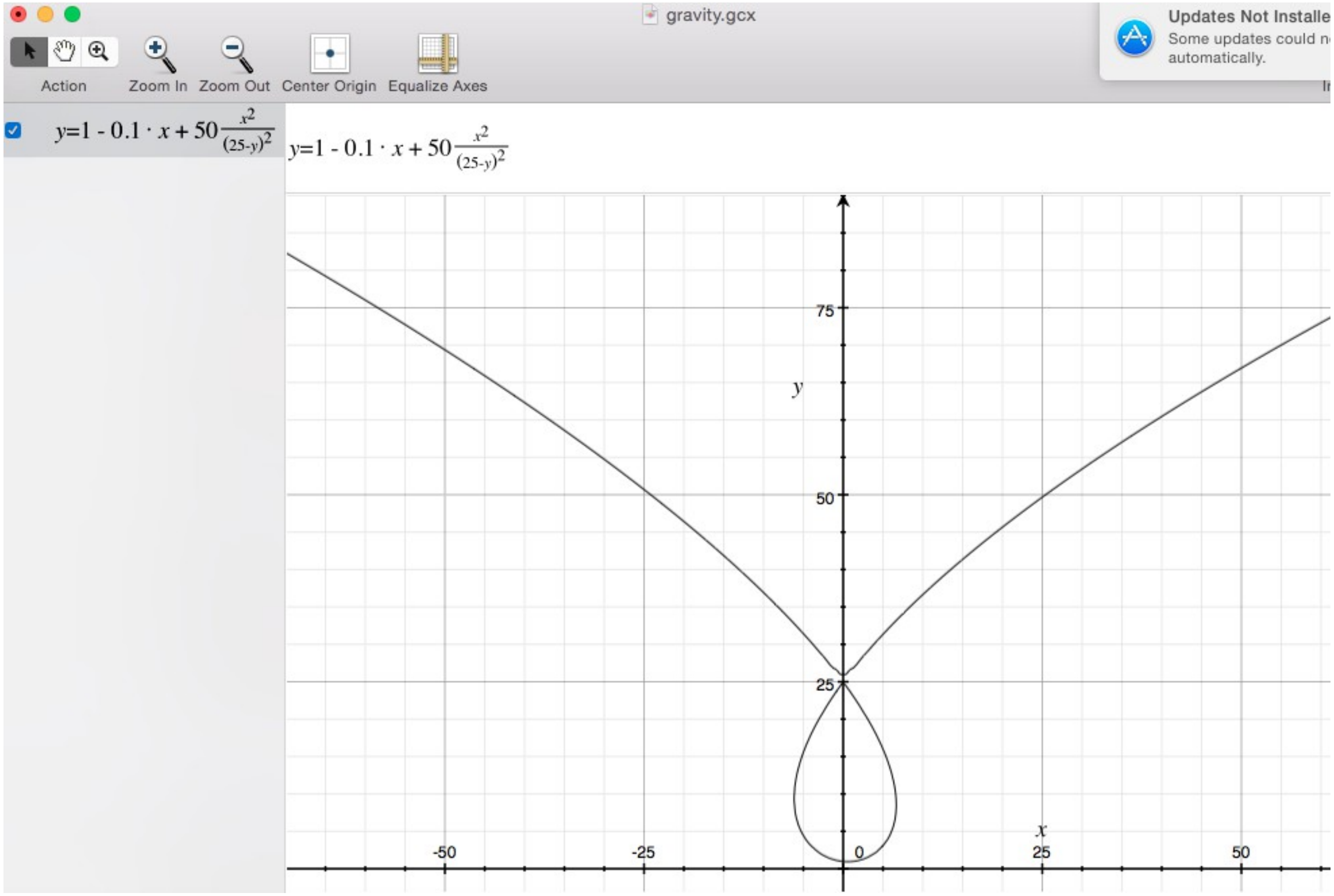
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y
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x
25
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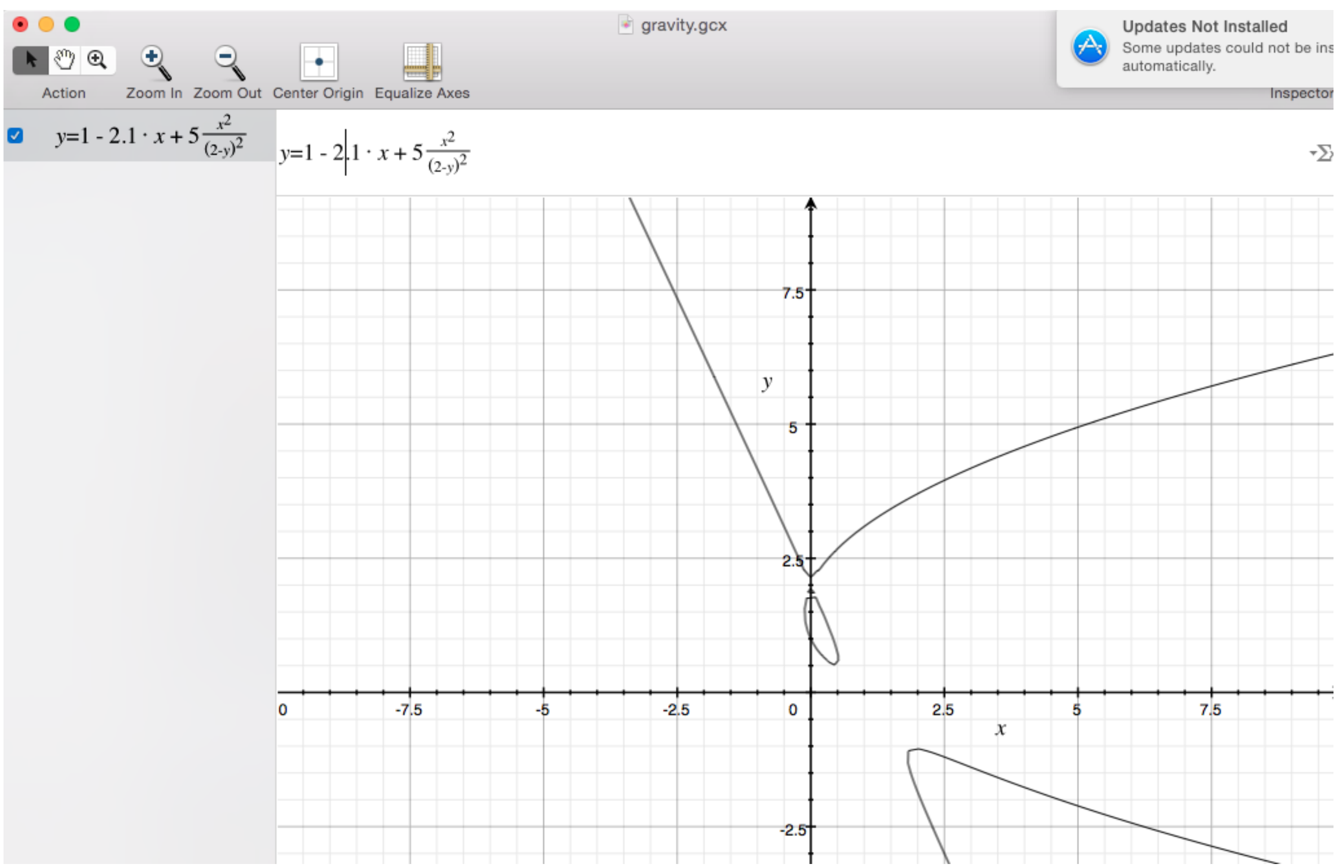
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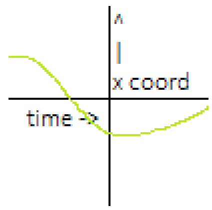
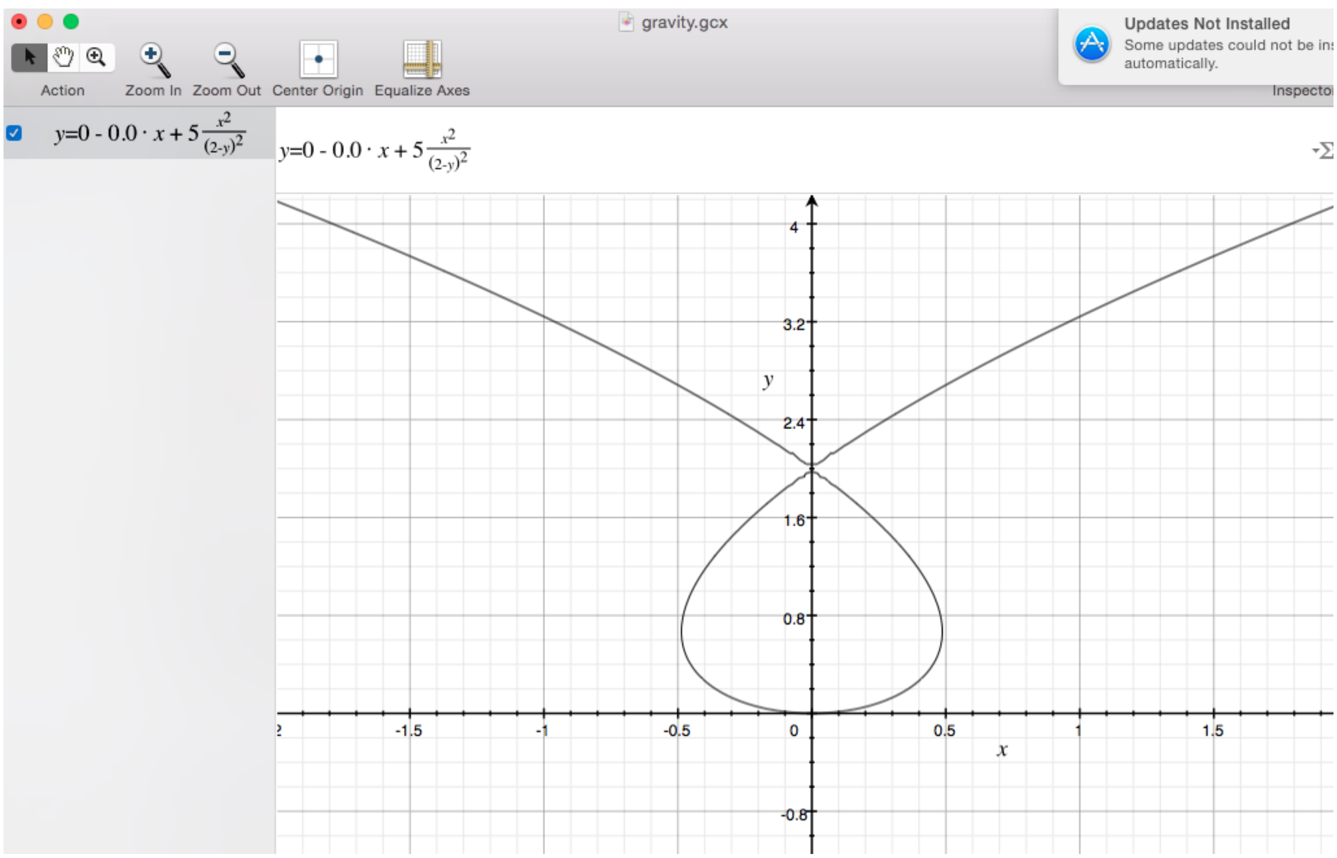
$y=1-2.1\cdot x+5\frac{x^2}{(2-y)^2}$
7.5
y
5
2.5
0
-7.5
-5
-2.5
0
2.5
5
7.5
x
-2.5

What does this graph show? It shows all values of time t and coordinate x that fit the rules and values put in. For a given x coordinate, it will give the time t that the acceleration will be equal to one given by gravity.

Although at first this would appear to show the orbit, an orbit would look more like this:



Following the natural trajectory through space only, we have a discontinuity at some points. Following the trajectory through space-time, we end up going back in time at one point, or else have an abrupt discontinuity. Remember, horizontal (x graph axis) is time.



Changing the initial velocity and position, we get different graphs. As long as we start outside the gravity source (positive radius), we get this sealed space at the bottom. Setting the starting position in the gravity source creates only an upper curve.

The sign of dx/dt, the relation of movement forward to the flow of time, changes three times following the trajectory from the outside. What does this mean?

Time is always moving forward for an observer at a constant rate, which means that the change in sign of dx/dt becoming negative, is actually a change in the direction of motion. What would be felt is a jerk and acceleration in the opposite direction, felt in the front first, as a probe continued its natural trajectory.

The sign of dx/dt changes three times. That means to an outside observer that it went back in time and came out the side it came in.

The sign of dx changes once, but dt changes twice, meaning it reverses time directions twice, but space once. To an outside observer, the time cannot go backward, and yet the relation to movement forward changes 3 times.

It would appear as though to the probe it would seem that it comes out where it came in, but in the other direction. What would happen if we accelerated forward each time we reached a point where dx/dt changes signs? Notice that dt never equals 0, and the negative and opposite time is added up as an absolute value. If we detected when the relation of the passage of time to our motion changed, felt by a jerk, we could reverse our natural fall in negative time.

Does the difference in perspective between the probe and outside observer result in an alternate outcome of events? What appears like a negative time direction to an outside observer will be a negative direction of motion to an infalling probe. If we hope to recover it, we must accelerate three times when signs change. But what if we accelerated at the first point only when dt changes signs? Would it be equivalent? To the probe it would appear it came out in negative land (or something indescribable) before it reached the $dx < 0$ point. It would not have had a time to reach the second point $dt < 0$ to accelerate, or the third point where signs change, and it would cancel out for both observers. Because it changes the relation of time to motion once, it would have floated out to an inside observer. Time is still reversed, remember. The signs have an effect in one perspective, and the trajectory in the original perspective.

So if we accelerate towards the mass or inner radius, what do we see? Because we reverse directions at $dt < 0$ to continue along the curve, we see another exit forward, the same way we came we came out. But we will come out in negative land if we don't accelerate at $dx/dt < 0$ after this. To us it appears as $dx/dt < 0$ but to the original observer (there is no outside at this point) it is actually $dx/dt > 0$.

It appears to an outside observer that no time passed between when it came in and came out, and since it experienced negative time, it shouldn't have had any time pass, but how do we reconcile it with the history it had inside the trajectory? Does it have a history if it reemerges?

Although it reverses time to us, its absolute time covered in the trajectory is seen from outside.

Assuming it isn't ripped apart and doesn't collide with the blackhole mass, what would a probe experience?

Using an accelerometer and an onboard computer to navigate we can travel through time and space. The graph of the function changes as we change the initial coordinate and adjust acceleration, which means that it can have different consequences. Also, what happens if we're late applying the breaks? It would appear as if we travelled in time a little, perhaps colliding with the inbound probe as it was coming. That is the first $dt < 0$ point. Perhaps delaying the breaks we can travel indefinitely.

We might have a manageable pull on the front and back if we calculated the force applied to those points at a given time.

Time-stepping through the equation, applying an initial velocity and coordinate that would be expected as we center around the current position, at equal time intervals will give a series of topologies. How would the graph evolve if we projected the trajectory centering initial x at the current expected position?

As we apply x0, v0, and t at each point, we can navigate. The changes that take place to the probe are opposite to the signs that appear from the original position. By applying acceleration, we change 2 time direction changes and 1 space direction change into 1 time direction change and 2 space direction changes. And in the blackhole that is the opposite.

According to relativity, time slows down as one crosses the event horizon, and one never reaches the center from the point of view of an outside observer. My math using the gravitational force shows that time slows down, but after reaching an internal space.

The challenge is confirming that you can go inside blackholes. If this is true, a probe would be able to travel in time. Although the nearest blackhole is 1600 light years away, perhaps one day we will be able to traverse it.

“These **Kerr Black Holes** would have a singularity that takes the form of a ring. It's singularity is not space-like, as demonstrated in the other model, but time-like instead. Only objects that enter the event horizon on it's equator would be subject to destruction via the singularity. The interior of the singularity is a area of negative space-time, implying the reversal of the force of gravity at this point. Another possible concept is that of objects within this plain having a negative radius, but no-one has yet been able to fathom out this idea rationally.” <http://www.astro.keele.ac.uk/workx/blackholes/index3.html>

[1] Poplawski, Nikodem J., "Cosmology with torsion: An alternative to cosmic inflation". *Cornell University Library*. Web. 4 Jul 2010