Time damping theory

A method of calculating satellite time dilation.

Yang Long

E-mail: 168119405@qq.com

Abstract

Time damping refers to the effect that matter is damped in the gravitational field, resulting in the slow time velocity of matter.

Special relativity is easy to be misled when studying alone, while time damping theory combines special relativity and general relativity.

After understanding the theory of time damping, you will find that general relativity is nothing more than this!

The theory of relativity is the basic law of physics. All the basic laws of physics should be simple, not complicated!

Any matter that cuts the gravitational field will produce time damping, which will slow down the time of the object. From a microscopic point of view, the movement period or frequency of various particles becomes slower, and the displacement becomes smaller, similar to the damping effect produced when a strong magnet approaches a conductor; the gravitational field is directional and flows along the direction of gravity. Objects on the earth's ground will be passively cut by gravity, resulting in time damping. This is consistent with the time slowing effect caused by the gravity of general relativity. In addition, when the object is moving at high speed, it will also produce time damping. Changes in the cutting effect, such as satellites cutting the gravitational field at a faster speed, are consistent with the clock delay of the special theory of relativity.

The above "cutting" explanation: refers to any movement relative to the gravitational field (the gravitational field itself is also flowing)

The term "cutting" comes from "cutting magnetic lines of induction". After the gravitational field and the electromagnetic field are unified, it may be possible to use "cutting"

Attachment: What is time? Time is the change in matter (frequency, displacement, etc.) and human perception (aging, heartbeat, etc.).

The speed of the passage of time is related to the speed of light, which is why the speed of light does not change!

Time flow rate: the speed (rate) of time passing.

The speed of light is the flow of time.

Since the strength of the gravitational field has a lower limit, the time flow rate has an upper limit.

That is, the time flow rate can be decelerated indefinitely, but not accelerated indefinitely.

Similar to the "absolute 0 degree" of temperature, the time flow rate has a maximum value.

Time damping theory does not discuss: the increase in quality and the decrease in scale, thinking that the two are just mathematical games, without derivation or explanation.

Time damping theory is not an absolute theory. Time damping theory is also a theory of relativity. It discusses the difference in time velocity of two objects.

Time damping is not damping to reduce energy.

The time-damped gravitational field has a different meaning from the existing "gravitational field". If there is a conflict, it is temporarily called the "undistorted gravitational field"...

Formula source:

The concept of time damping needs to be quantified after it comes out. Obviously, there are some differences between the time damping theory and the "curved space-time" theory.

So I want to add an unknown parameter k to the special relativity formula to realize the influence of gravity on time, that is, to derive the equivalent velocity expression of the gravitational field:

Extended special relativity expression:

$$(ct)^2 = (ct')^2 + (|\vec{\mathbf{v}} + k\vec{\mathbf{c}}|t)^2$$

When the gravitational field strength is 0, $k = 0$; and

$$|\vec{\mathbf{v}} + k\vec{\mathbf{c}}| < c$$

Maybe, $k = 1$ at the event horizon of the black hole.

The purpose is to add gravitational parameters to the formula of special relativity.

How to deduce the expression of k?

Because the Schwarzschild radius is calculated based on the escape velocity, it is guessed that the velocity of the gravitational field may be the escape velocity. The "equivalent velocity" of an object can be obtained by adding the escape velocity of the object and the motion velocity vector:

$$(c\Delta t)^2 = (c\Delta t')^2 + (|\vec{\mathbf{v}} + \overrightarrow{\sqrt{\frac{\mathbf{2GM}}{\mathbf{R}}}}|\Delta t)^2$$

$\overrightarrow{\sqrt{\frac{\mathbf{2GM}}{\mathbf{R}}}}$ is escape velocity vector. The direction is opposite to the direction of gravity.

R is the distance from the object to the center of the earth.

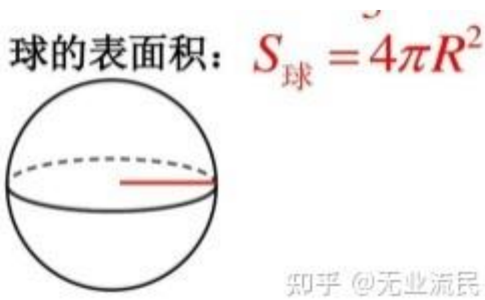
Δt is infinity time. $\Delta t'$ is object time. $\vec{\mathbf{v}}$ is object velocity vector.

The Schwarzschild radius is calculated based on the escape velocity. The time velocity at Schwarzschild's radius is close to 0, v is close to c in the formula, and the ground escape velocity is about 11.2km/s, so the gravitational field is inferred. Pass through your body at a speed of approximately 11.2 kilometers per second.

The high-speed gravitational field passing through your body will give you time to damp it, causing the flow rate of your body to slow down. The larger the gravitational field, the more obvious this effect.

Consider whether time and space are curved:

The surface area formula of the ball:



Escape speed:

$$v=\sqrt{\frac{2GM}{R}}$$

The surface area and radius of the sphere are in a square relationship, and the escape velocity and radius are also in a square relationship.

It shows that the gravitational field is evenly distributed and there is no bending space.

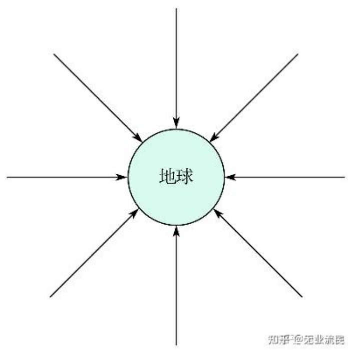
If it is uniform, there should be a conclusion that the product of the surface area and the strength of the gravitational field is constant.

$$S=4\pi R^2$$

$$g=\frac{GM}{R^2}$$

$$Sg=4\pi GM$$

It is indeed a constant. **Maybe: the space is not curved!**

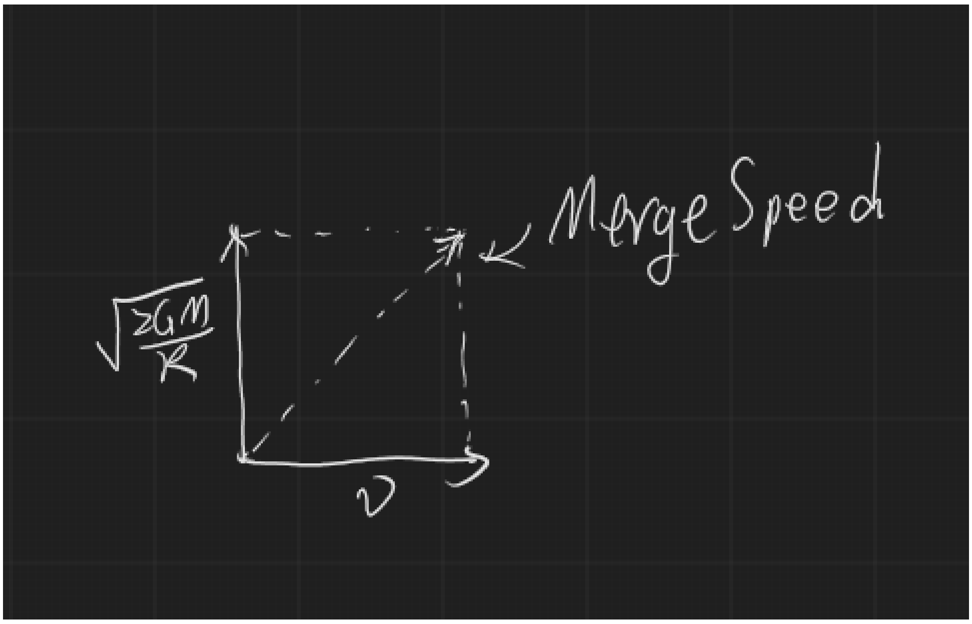


If the rain falls vertically, people standing still and people running back and forth, and finally return to the original point, who gets the rain a lot?

Usually, the more you run, the more rain. In the same way, when you run in the gravitational field force, it will cause the amount of gravitational field to increase, which will cause you to produce more time damping and cause your time to expand. This is the delay of the moving clock.

Of course, if he runs far away to avoid the rain (the gravitational field is small), and then runs back, because his time flow is relatively fast during the period of avoiding rain, so whoever runs back has the faster time and the slower time, and There is no conclusion.

The flow direction of the gravitational field is perpendicular to the movement direction of the satellite, so the Pythagorean theorem is used to calculate the equivalent speed:



Use the formula to calculate(python code):

```
import math

G = 6.673889 * 10 ** -11
M = 5.9722 * 10 ** 24
c = 299792458
pi = math.pi

# The distance from the ground to the center of the earth
R = (6371 + 0) * 1000

# Linear velocity of the earth's surface, Latitude 23.5°
vl = math.cos(23.5 * pi / 180) * R * 2 * pi / (3600 * 24)

# Field velocity. Surface escape velocity.
vc = math.sqrt(2 * G * M / R)

# Merge speed
vh = math.sqrt(vl ** 2 + vc ** 2)
```

```python
tp = math.sqrt(1 - vh ** 2 / c ** 2)
# Swelling microseconds per day, 1 μs equal 10-6 s
x0 = (1 - tp) * 3600 * 24 * 1000 * 1000
print("x1 Microseconds of ground expansion per day:", x0)
x1 = x0

# *------

# Height + radius of the earth
h = 20200  # GPS satellite orbit altitude
R = (6371 + h) * 1000

# GPS satellite linear velocity
vl = math.sqrt(G * M / R)

# GPS satellite field velocity
vc = math.sqrt(2 * G * M / R)

# Merge speed
vh = math.sqrt(vl ** 2 + vc ** 2)

tp = math.sqrt(1 - vh ** 2 / c ** 2)
# Swelling microseconds per day, 1 μs equal 10-6 s
x0 = (1 - tp) * 3600 * 24 * 1000 * 1000
print("x2 Microseconds of satellite expansion per day:", x0)
x2 = x0

print("x1 - x2: ", x1 - x2, "μs  <=======  Microsecond expansion of 
satellite relative to ground")
```

result:

x1 Microseconds of ground expansion per day: 60.228801146422484

x2 Microseconds of satellite expansion per day: 21.630620494761388

x1 - x2: 38.598180651661096 μs <======= Microsecond expansion of satellite relative to ground

Wow, 38.5 microseconds!

Comply with the time dilation of GPS satellites!

The escape speed is suspected to be the speed at which the gravitational field cuts you!

Why is the escape velocity? This requires careful consideration of the philosophical issue of escape speed!

Thinking about the philosophical issue of escape velocity may be able to understand the rationality of using escape velocity.

Because the value calculated by the above formula is in line with the actual value of GPS satellites, it can be said that **the formula has been verified!**

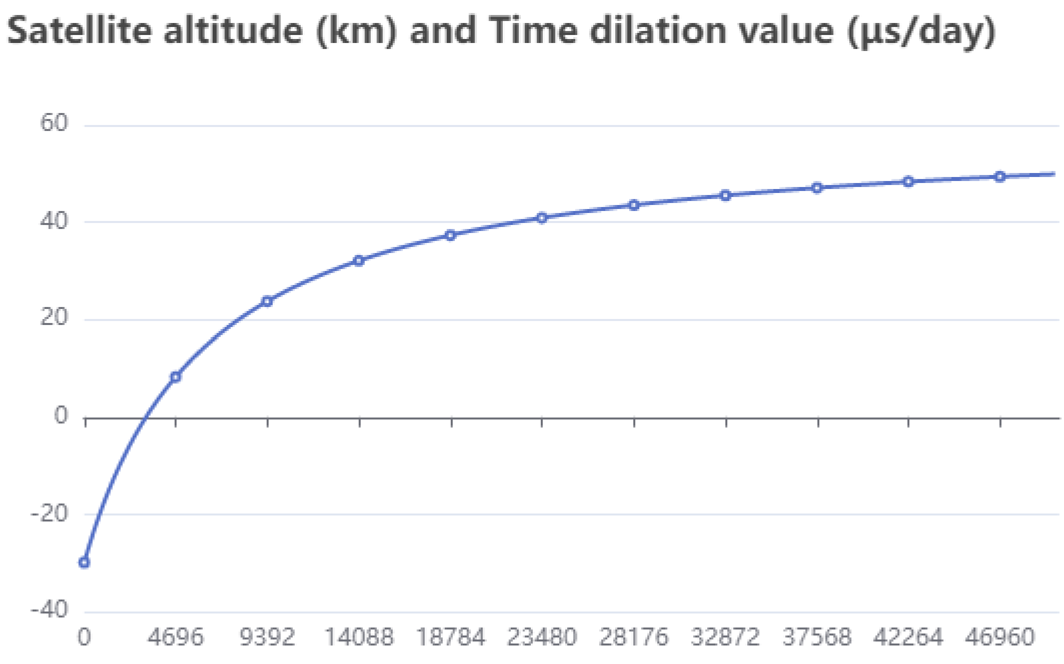
I took an absolute time: infinity!

Modifying the above parameters can be calculated: Beidou time dilation is about 39.5 microseconds every day.

Modifying the above parameters can be calculated: when the satellite orbit height is about 3171.7km (radius is about 8542.7km), the clock frequencies of the ground and the satellite are almost the same.

Modifying the above parameters can be calculated: the synchronous satellite expands by about 46.5 microseconds every day.

Calculate the time dilation value of each height and plot it:



Finally, I hope everyone who sees the article can answer my question with their own knowledge:
At the same point on the earth, an object moves up and down at a velocity v ($v < c$) respectively. Are their instantaneous time expansion rates the same?

Thank you for reading!