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Unified Theory of Force

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Abstract: ***Unified theory of force defines that not only gravity but any kind of force depends upon space-time curvature and a general equation of unified force is suggested.***

Keywords: Unified force theory, space-time curvature, force field

If S is the position in space of a particle of mass 'm' at a time t=t then its velocity after a time interval of dt will be as follows if $\frac{d^i s}{dt^i}$ *= constant*

$S]_{t=t+dt} = S]_{t=t} + \frac{ds}{dt}\frac{t}{1!} + \frac{d^2s}{dt^2}\frac{t^2}{2!} + \frac{d^3s}{dt^3}\frac{t^3}{3!} + \cdots + \frac{d^is}{dt^i}\frac{t^i}{i!}$, *for* $\frac{d^is}{dt^i}$ = constant

Now, $\frac{ds}{dt}]_{t=t+dt} = \frac{ds}{dt}]_{t=t} + \frac{d^2s}{dt^2}\frac{t}{1!} + \frac{d^3s}{dt^3}\frac{t^2}{2!} + \frac{d^4s}{dt^4}\frac{t^3}{3!} + \cdots + \frac{d^is}{dt^i}\frac{t^{(i-1)}}{(i-1)!}$

And so on.

Thus, $\frac{d^{(i-1)}s}{dt^{(i-1)}}]_{t=t+dt}$ =, $\frac{d^{(i-1)}s}{dt^{(i-1)}}]_{t=t} + \frac{d^is}{dt^i}\frac{t}{1!}$ and finally $\frac{d^is}{dt^i}$ = constant

Then force F = m $\{ \frac{d^is}{dt^i} + \frac{d^{(i-1)}s}{dt^{(i-1)}} + \ldots\ldots + \frac{d^2s}{dt^2} \}$

$= m [\frac{d^is}{dt^i} \{ 1 + \frac{t}{1!} + \frac{t^2}{2!} + \cdots + \frac{t^{(i-2)}}{(i-2)!} \} + \frac{d^{(i-1)}s}{dt^{(i-1)}} \{1 + \frac{t}{1!} + \frac{t^2}{2!} + \cdots + \frac{t^{(i-3)}}{(i-3)!} \} + \ldots + \frac{d^2s}{dt^2}]$

Now, let us assume $f = 1 + \frac{t}{1!} + \frac{t^2}{2!} + \cdots + \frac{t^n}{n!}$

Thus, $\frac{df}{dt} = 1 + \frac{t}{1!} + \frac{t^2}{2!} + \cdots + \frac{t^{(n-1)}}{(n-1)!} = f - \frac{t^n}{n!}$

Now taking integration in both side, $f = ft - \frac{t^{(n+1)}}{(n+1)!} + c$ [if t =0, c = f]

Thus, $ft = \frac{t^{(n+1)}}{(n+1)!}$ or $f = \frac{t^n}{(n+1)!}$

So, force $F = m [\frac{d^is}{dt^i}\frac{t^{(i-2)}}{(i-1)!} + \frac{d^{(i-1)}s}{dt^{(i-1)}}\frac{t^{(i-3)}}{(i-2)!} + \ldots\ldots\ldots + \frac{d^3s}{dt^3}\frac{t^1}{(2)!} + \frac{d^2s}{dt^2}]$

Now if F = constant, it will be independent of 't' thus $\frac{d^2s}{dt^2}$ = constant and $\frac{d^3s}{dt^3} = 0$. So, $F = m\frac{d^2s}{dt^2}$

Now if $\frac{dF}{dt}$ = constant, means it will be independent of 't' thus $\frac{d^3s}{dt^3}$ = costant and $\frac{d^4s}{dt^4} = 0$ so, $F = m [\frac{d^3s}{dt^3}\frac{t^1}{(2)!} + \frac{d^2s}{dt^2}]$ and so on.

Now if $\frac{d^is}{dt^i}$ = constant then $\frac{d^{(i-2)}F}{dt^{(i-2)}}$ = constant.

and $F = m [\frac{d^is}{dt^i}\frac{t^{(i-2)}}{(i-1)!} + \frac{d^{(i-1)}s}{dt^{(i-1)}}\frac{t^{(i-3)}}{(i-2)!} + \ldots\ldots\ldots + \frac{d^3s}{dt^3}\frac{t^1}{(2)!} + \frac{d^2s}{dt^2}]$

$= m\sum_{k=2}^{i} \frac{d^ks}{dt^k}\frac{t^{(k-2)}}{(k-1)!} = m\sum_{k=0}^{i} \frac{d^kf}{dt^k}\frac{t^{(k)}}{(k+1)!}$ where $f = \frac{d^2s}{dt^2}$

Now, for any kind of force field $\frac{d^2s}{dt^2} = f = c/d^2$ where c = constant depending upon the intensity of force field d = space between them

$F = \lim_{i\to\infty} m \sum_{k=0}^{i} \frac{d^kf}{dt^k}\frac{t^{(k)}}{(k+1)!}$ where $f = \frac{d^2s}{dt^2} = c/d^2$

If a particle creating force field having mass M, electric charge Q and magnetic intensity m_1 then c = GM(for gravitational field), KQ (for electric field), $\mu m_1/4\pi$ (for magnetic field)

Now for $f = c/d^2$ if initial velocity u = 0,

$\frac{df}{dt} = (-2c/d^3)$ u = 0 { as u = 0}

$\frac{d^2f}{dt^2}$ =[(3)!c/d^4] S^2 + (-2c/d^3) f = (-2c/d^3) (c/d^2)

$\frac{d^3f}{dt^3} = (2.5\ c^2/d^6)$ u = 0

$\frac{d^4f}{dt^4} = 0 + (2.5\ c^2/d^6)\ f = (2.5\ c^2/d^6)\ (c/d^2)$ and so on.

So, for k = 2n

$\frac{d^{2n}f}{dt^{2n}} = (-1)^{(n+1)} \prod_0^n (3n-1)\ c^{(n+1)}/d^{(3n+2)}$

$F = \lim_{i\to\infty} m \sum_{n=0}^{i} \frac{d^{2n}f}{dt^{2n}}\frac{t^{(2n)}}{(2n+1)!}$

$F = \lim_{i\to\infty} m \sum_{n=0}^{i} (-1)^{(n+1)} \prod_0^n (3n-1)\ c^{(n+1)}/$ d(3n+2)x*t(2n)(2n+1)!*

$F = \lim_{i\to\infty} \frac{m}{d^2} \sum_{n=0}^{i} (-1)^{(n+1)} \frac{\prod_0^n(3n-1)}{(2n+1)!} (GM)^{(n+1)} \frac{t^{(2n)}}{d^{(3n)}}$

This is for gravitational field only where force depending upon $\frac{t^2}{d^3}$ (space time) curvature with nth power. Similarly for electric and magnetic fields also force depends upon $\frac{t^2}{d^3}$ (space time) curvature with nth power.

For electric field on a particle having charge q

$F = \lim_{i\to\infty} \frac{q}{d^2} \sum_{n=0}^{i} (-1)^{(n+1)} \frac{\prod_0^n(3n-1)}{(2n+1)!} (KQ)^{(n+1)} \frac{t^{(2n)}}{d^{(3n)}}$

And for magnetic field on a particle having magnetic intensity m_2

$F = \lim_{i\to\infty} \frac{m2}{d^2} \sum_{n=0}^{i} (-1)^{(n+1)} \frac{\prod_0^n(3n-1)}{(2n+1)!}$ (μm1/ 4π)(n+1)*t(2n)*d(3n)

So, if F is the unified force applied by object (1) (having mass M, electric charge Q, magnetic intensity m_1) upon a stationary object (2) (having mass m, electric charge q, magnetic intensity m_2) whose initial velocity u = 0 then

$\mathbf{F = \lim_{i\to\infty} \frac{1}{d^2} \sum_{n=0}^{i} (-1)^{(n+1)} \frac{\prod_0^n(3n-1)}{(2n+1)!} \frac{t^{(2n)}}{d^{(3n)}} \{m(GM)^{(n+1)} + q(KQ)^{(n+1)} + m2(\mu m_1/4\pi)(n+1)\}}$

$\mathbf{F = \lim_{i\to\infty} \frac{1}{d^2} \sum_{n=0}^{i} C \frac{t^{(2n)}}{d^{(3n)}} \{m(GM)^{(n+1)} + q(KQ)^{(n+1)} + m2(\mu m_1/4\pi)(n+1)\}}$

Where , a constant $\mathbf{C = \frac{(-1)^{(n+1)} \prod_0^n(3n-1)}{(2n+1)!} = f(n)}$

So, conclusion is not only gravity but all kinds of force depend upon space-time curvature.