Two Virtual Constants

My equation for gravity is supported by these two equations:

$$P = \boldsymbol{I_f} D V_p \quad (1)$$
$$\boldsymbol{F_p} = P A f_i \quad (2)$$

Equation 1 calculates the percent of force applied to an object. The percent is assumed to be proportional to the mass that the force of gravity interacts with. Density times the volume of the path determines the amount of mass. The statement of proportionality is made into an equation using the virtual constant I_f.

Equation 2 was derived when the value of f_i had to be multiplied by 5 when the number of angles in the plane was reduced by 5. It occurred to me that the product of PAf_i was like a constant although it does not appear in the equations. So, F_p is a virtual constant.

So what is a virtual constant? Why not an actual constant? Here is my definition of a constant:

"A constant is an independent term with a precise value."

A virtual constant can be used like a constant, but may only apply in certain regions of the universe.

The Newtonian G
The gravitational constant G is generally termed a constant. The only reason for this is that Newton's Gravity statement is assumed to be precise and R squared is a law. Newton himself struggled with the idea that R squared applied in all cases. If R squared is not a law, then G cannot be an absolute constant. Dark matter is a case where ad hoc conditions are conjured up to keep G an absolute constant.

Models and Equations
All models for physics are approximations to reality. There equations developed from models are mathematical statements which use precise math. When constants are needed to develop these equations they cannot be absolute constants. This is true of my two virtual constants.

Mass Distribution
There are well known variations in gravity due to mass distributions. There is a gravitational variation on the earth caused by the moon and we call these lunar tides. The motion of the moon is affected by the gravitational effect of the earth, but it is also affected by the sun and other planets. Mass distribution changes the effect of gravity. Newton's equation treats all of mass as point masses located at the geometrical center of the object. It requires that all objects be perfect homogenous spheres. And it does very well in most cases.

Just Like Newton

My equation forces me to use the actual distribution of mass within each object. I can make the object perfect homogeneous spheres and get results just like Newton. This makes my equation just like Newtons for a two body model. But I can also make the earth an oblate spheroid and calculate the value of gravity at different latitudes using the mass distribution.

Not Like Newton

But my equation is different than Newtons when there is a three body model. Equation 1 shows the percent of force used as gravity passes through one object. When it leaves the object the force is reduce by the quantity (1-P). If it passes through a second object before moving to the target object there is a double reduction show by the term $(1-P_1)*(1-P_2)$. This adds an effect that is not like Newton. This can help explain discrepancies concerning models of three bodies or more.

Back to Dark Matter

When using Newton's equation and assuming that the mass of the galaxy is at the center, the velocity of the stars at the edge of the galaxy is too high. The following equation applies to this calculation:

$$v = \sqrt{GM_g/R} \qquad (3)$$

Since G is a constant and R is the known distance of the star from the center of the galaxy, the only term that can be changed is the mass. By adding dark matter the mass of the galaxy increases and explains the velocity of the star. Dark matter is invented to make sure that G is still a constant.

When using my equation, the distribution of mass in the galaxy must be taken into consideration. Using a severely oblate spheroid and a homogeneous mass distribution as the model, the reduction of force through the mass of the galactic plane will cause the force to be higher towards the center of the galaxy. This higher force causes the higher velocity. My two virtual constants do not have to change.

To do this using Newton's equation requires that G be increased. However, using my equation, it appears that I_f and F_p can remain the same and not have to invent dark matter. This makes it appear that these two constants are more real than G.

But being more realistic, the model, the equation, and the calculations have many approximations that bring the issue of absolute constants into question. I maintain my position, that these two terms are virtual constants that can be used some cases, but may not work in all cases.

Bob de Hilster
5/7/2015