Pluto should be planet again- discovery of principial error in astronomical calculations

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Popular investigation of biggest methodic blunder of astronomy- how to obtain masses from orbital geometry- and how it helped to "disqualify" Pluto as a planet. In reality Pluto should be several times heavier than Eris.

keywords: Pluto mass determination error, vortical celestial mechanics, DesCartes, Newton, Kepler, Hegel

Whoever approaches this part of physics soon realises... that astronomy's laws derive their origin from another science, from mathematics, rather than actually having been teased from nature or constructed by reason. Our great countryman Kepler, blessed with the gift of genius as he was, discovered the laws according to which the planets circulate in their orbits. Later, Newton was celebrated for proving these laws not from physical, but from geometrical grounds, and also, despite that, for integrating astronomy into physics. Now Newton certainly did not introduce the force of gravity, which he wants to identify with centripetal or attractive force, into this part of physics... Not only was Newton careful to call his famous text, in which he describes the laws of motion and gives examples of them from the world system, 'mathematical principles of natural philosophy;' he also reminds us repeatedly that he uses the expressions 'attraction', 'impulse' and 'propensity towards a centre' indiscriminately and interchangeably taking these forces not in the physical but only in the mathematical sense. The reader must not expect, then, on the basis of such terminology, to find definitions of the types and modes of action, causes, or physical grounds anywhere in Newton's work. Neither may he attribute true and physical forces to the centres, which are only mathematical points, even when Newton speaks of forces strongly attracting to the centre or of these as central forces...

G.W.F.Hegel. *De orbitis planetarum.* 1801

Reader might be surprised to know, that here is much truth in devastating judgment of famous 19th century German philosopher. Celestial mechanics even today is dominated by geometry and doubtful mathematical approximations. Nobody knows, how Kepler's laws are working (Mathis, 2005), what are causes of movement in Universe, why the Earth rotates 150 million kilometers from the Sun, but not, say, 120 million ones and so on. Masses of celestial bodies are derived also from geometry (fig.1)- interestingly is to see, how astronomers are not able to think beyond that. Thus NASA page from June 14, 2007 tells us plain, that

“astronomers **measure** mass of largest dwarf planet”- persuading the public, that here is exact method how to do this.

Let us look for “measurement” of masses of celestial objects closer.

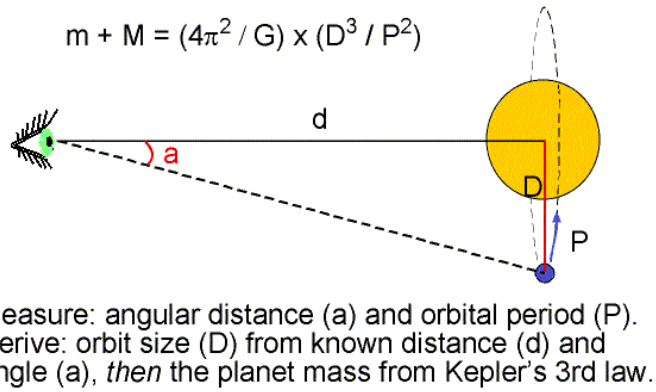

Fig. 1 Most tricky part of astronomy. Credit: Nick Strobel's Astronomy Notes

From mysterious Kepler 3rd law (for solar system planets):

$$A^3/P^2 = \text{constant}$$

were **A**- mean orbital distance of planet (astronomic units), **P**- orbital period of planet, days

Newton moves further in obscurity, stating that

$$(M+m) = A^3/P^2$$

were **M** and **m**- masses of central celestial body and it’s satellite, respectively.

At first sight, here is no logic at all. We should remember however, that equation in question is about connection of *self-rotating* central body (such as the Sun) and orbital parameters of secondary body (such as the Earth). Today, official science write mentioned connection as

$$GM = 4\pi A^3/P^2$$

were **G** is gravitation constant.

Mysterious connection between revolution of central body and orbital rotation of secondary one can be imagined as certain gravitation whirlpool. However this way demands, that space must be absolute vacuum, which is not the case.

A forgotten rival to Newton and forerunners (Bennett, 1975) is DesCartes physics (Spratt, 2016), stating that revolution of central body creates a vortex, which moves planets according to Kepler’s laws.

Comparison data of systems small planets- its satellites for largest transneptunian objects (table 1) shows several red flags.

Primary	Dia-meter	Self-rotation period	Secon-dary	Diameter	Mean orbital distance A	Orbital period P, hours
Orcus	913km	13.19 h	Vanth	276 km	9030km	229 h
Salacia	921km	6.09 h	Actaea	286 km	5619km	132 h
Haumea	1252km	3.92 h	Hi'iaka	310 km	49 880 km	1187 h
Makemake	1426km	7.77 h	S/2015	175 km	≥21 000km	≥288 h
Pluto	**2329km**	**153.3 h**	**Charon**	**1212 km**	**19 591km**	**153.3 h**
Eris	**2330km**	**25.9 h**	**Dysnomia**	**700 km**	**37 350km**	**378.6 h**

Table 1. Data of largest transneptunian objects.

First, it is large relative size of satellites of Pluto and its rival Eris. Astronomers, as in 17th century, care about orbital geometry only; in fact, such large satellites as Charon and Dysnomia could be outside of linear applicability of Kepler's/Newton's law.

Second, an empiric effect of mass of rotating primary celestial body is ability to keep satellites near its equatorial plane (fig 2.).

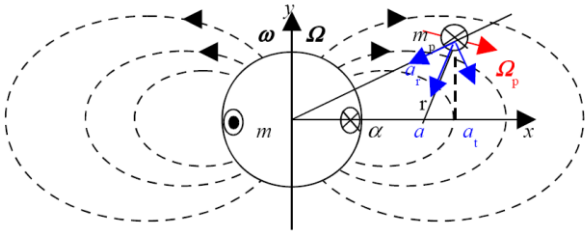

Fig.2. **Imaginated forces from gravitomagnetic analogy, which action result in equatorial orbits of satellites**. From DeMees, 2003.

For Pluto we see this clearly: inclination of it's satellite Charon to Pluto's equator is only 0.080 degrees. For moon of Eris Dysnomia data is indirect- first, we have been told, that "the orbital inclination, the angle at which Dysnomia orbits in relation to the orbital plane [of Eris] is 142 degrees". Robert Johnston, from other side, mentions number 61.3 degrees here. Could be, therefore, that orbit of Dysnomia is inclined against equator of Eris, that should mean, that mass of Eris is overestimated.

Third, self rotation period of Pluto is very slow in comparison to its rival Eris (153.3 hours *vs* 25.9 hours). As it is not accidentally value, we can see from Sila-Nunam binary asteroid system (table 2.):

Dimensions	250±30 km (Sila) 235±28 km (Nunam)
Semi-major axis	2,777 ± 19 km
Orbital period:	12.50995 ± 0.00036 days
Rotation period	12.510 days
Density	0.72 (+0.37 -0.22)

Table 2. Some parameters of Sila-Nunam system.

It is clear, that such small value of density as in table 2 is simply error of astronomers (similarly to Pluto, as we will see further. Magnitude of error could be three times or even more).

Self rotation speed for Pluto is 0.041 radians per hour, for Sila- 0.021 radians per hour and for Eris- 0.24 radians per hour. In case of Pluto and Sila here obviously are some unaccounted effects which slow their self- rotation speed. It is clear, that self-rotation speed of Eris also is slowed a bit by this effect.

Simplified correction of Newton in style of Descartes than could be

$$\mathbf{M*\omega*k = A^3/P^2}$$

were **ω**- equatorial spinning speed of central body and **k**- coefficient, which shows, how effective is vortex, produced by spin of central body, in putting a spin to satellites. If we neglect possible differences of coefficient **k**, we get for Pluto (data from table 1):

$$\mathbf{M*k= 7.80*10^{10}}$$ units

and for it's competitor Eris

$$\mathbf{M*k= 1.52*10^{9}}$$ units.

What means, in real celestial mechanics Pluto should be several times heavier than Eris. Thus Mike Brown (2012) could not really “kill” Pluto- rather exposed astronomy as a heap of mysterious dusty equations which nobody from astronomers really understands.

It is time for Pluto to hit back...

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