

# THREE BODY PROBLEM - A DECEPTION

(According to 'Hypothesis on MATTER')

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*Abstract:* By simple mechanics, it is impossible for a free body to orbit around another moving body, in any type of closed geometrical path. However, while considering two body problems, relative parameters of bodies are considered with one of them steady in space. This simple method of mathematical analysis can give accurate prediction of their future relative parameters. Orbital path of a planetary body appears around its static central body. Circular/elliptical orbits around a static central body, being an imaginary figure, has no value other than to indicate relative positions of concerned bodies. All macro bodies, in nature, are moving. In cases of moving central bodies (real situations) or when there are more than two bodies in a system, relative considerations cannot describe their orbital paths. Due to phenomenal success of solution to two body problem by relative considerations, a firm but erroneous belief has established that all planetary bodies move around their central bodies. Adamant belief in imaginary circular/elliptical orbital path is carried forward to three body system to create an imaginary and unsolvable problem. Three body problem (as considered today with respect to planetary motions) is unsolvable because real and imaginary situations are mixed in it. It is nothing but a deception from reality, adopted to create a baseless mystery.

*Keywords:* Relative frame of reference, absolute frame of reference, planetary orbits, orbital path, apparent orbit, real orbit, two body problem, three body problem, Hypothesis on MATTER.

## Introduction:

A planetary system, with a central body, a planet and a satellite (Sun, Earth and Moon) is considered in this article. Only linear motions of macro bodies are taken into account. Same principle of argument may be carried forward to other multi-body systems also, with appropriate modifications. Figures, in this article, are not to scale. They are depicted to highlight points presented. Term 'force' is used in its general meaning to specify 'cause of an action'. Elliptic paths include circular paths also. All conclusions expressed in this article are taken from the book 'Hypothesis on MATTER' [1]. For details, kindly refer to the same.

## Relative motions:

As no absolute reference is currently available, in physics, we use relative frames of references. By using a relative frame of reference, we assume certain region or a particular body is without translational motion (or is in an assumed steady state) and use relative motions of other bodies, with respect to the static reference, for all our purposes in mechanics. An alternative concept, advanced in reference [1], envisages a real universal medium structured by matter particles and which fills the entire space to encompass all three-dimensional matter bodies. As this medium is normally homogeneous and reasonably static, it can provide an absolute reference for all actions and movements in nature.

In nature, no three-dimensional matter body can remain static in space. Each macro body has certain

inherent motion and appropriate magnitude of work (kinetic energy) associated with it. By choosing a body as a (static) reference, in that instant, we wipe-out whole of reference body's kinetic energy, associated with its linear motion. Simultaneously, we modify magnitudes of kinetic energies associated with linear motions of all referred bodies, considered. Although this is an unreal situation, it is convenient for general understanding of mechanics and mathematical analysis with respect to relative positions of the bodies. When we start assigning reality to resulting parameters, other than relative positions, it will invariably distort any ensuing theories/physical laws.

Parameters of bodies or paths traced by them, as considered in the above situation, are unreal with respect to static universal medium. These parameters have no relation to real movements or other parameters of considered bodies, in space, except their relative positions. Theories or mathematical treatments, using these apparent paths (geometrical figures) of moving bodies, represent unreal circumstances. They can, at the most, indicate assumed or imaginary results, which may coincide with our observations. They are always in relation to a steady (immobile) state of chosen reference within a system of bodies. These apparent or imaginary parameters cannot provide results for real physical actions.

Two independent bodies can be related only by their relative positions (or other parameters) in space. These are quantified by distance and relative direction between them. Relative considerations can give right results only in determining past or future relative positions of macro bodies, considered. They are unable to provide real parameters of other states of macro bodies (size, work-done, temperature, pressure, matter content, kinetic energy, etc.) or shapes of their paths.

A moving body can be assumed as a static reference with respect to an observer, provided the observer is assigned with imaginary motion in opposite direction at equal linear speed. By doing so, magnitude of kinetic energy of moving body is reduced to zero and the observer is given appropriate magnitude of kinetic energy to maintain his apparent motion. An action on reference body's linear motion by an external effort will appear to produce its results on observer's apparent motion rather than on the state of (motion of) reference body. In order to maintain moving body as a reference, it is necessary to refrain from changes in its assumed static state (of motion). All real changes in its state of motion are born by apparent motions of observer. An external effort, acting on the observer can change his state of motion. This change will be born by the observer, himself.

Calculations, based on observer's apparent (relative) motion can give correct results with respect to their relative positions, for state of bodies within a system in the same region of space. These results will be true only within the system and it will not constitute physical reality. When an external effort acts on reference body, real action is only in the change of state of (motion of) the reference body. And when an external effort acts on the observer, real action is only in change of state of (motion of) the observer. However, as the reference body is assumed static, in both cases apparent changes are noticed in magnitude of kinetic energy and corresponding state of (motion of) the observer.

Real physical action of a small linear effort on the observer, towards reference body, is to move the observer towards reference body. However, in the case considered above, apparent motion and speed of motion of observer encompasses both, real physical action and apparent motion, of observer. Observer will apparently move in a resultant direction at a resultant speed. Magnitude of resultant action is greatly influenced by direction of applied effort. This does not correspond to real physical action on observer. Real physical actions can take place only with respect to an absolute reference. Only a static universal medium can provide an absolute reference. If bodies are in different regions of space with differing properties of universal medium, this type of assumption may not work well.

## **Linear motion of a rotating body:**

Linear and rotary motions of a macro body are entirely separate. Each of them is produced by separate set of work-done, associated with the body. However, each point on a linearly moving rotating body has its own path of resultant motion. Motion and path of each point appear as resultant of linear and rotary motions of the body. In figure 1, 'A' shows a rotating body that has no linear motion. Centre point of the body 'O' may be assumed steady in space. Point P on its periphery traces a circular path, as shown by the circle in dashed line. Let the body develop a constant linear motion, as is shown by 'B' in figure 1 and its centre of rotation moves from  $O_1$  to  $O_2$  at a constant speed, while the body turns through one revolution. Point  $P_1$  on its periphery traces a loop as shown by the black curved line starting from  $P_1$  and ending at  $P_2$ .

‘C’ in figure 1 shows the rotating body moving at a higher linear speed. Centre of rotation of body moves linearly through a larger distance from  $O_1$  to  $O_2$ , while the body turns through one revolution. Loop traced by a peripheral point becomes narrower as linear speed increases, for same rotary speed. ‘C’ shows path of a peripheral point during one rotation of the body. Continuous loops in black from  $P_1$  to  $P_n$  in ‘D’ shows a continuous path traced by peripheral point in space, while centre of rotation of rotating body moves linearly from  $O_1$  to  $O_n$  along line XX. As linear speed of the body increases in relation to its rotary speed, loops in path of peripheral point gradually becomes narrower until loops disappear altogether at a stage. At this stage, body’s linear speed equals  $\pi$  times its radius (distance of the peripheral point from the centre of rotation of the body) during every rotation of the body. Black series of semi-circular paths ‘E’ in figure 1 shows curved path traced by a peripheral point. Resultant path of peripheral point consists of semi-circular curves with their convex sides in same direction. Path of peripheral point starts from  $P_1$  and advances to  $P_n$  in ‘E’, while centre of rotation of the rotating body moves linearly from  $O_1$  to  $O_n$  along line XX. As linear speed of rotating body exceeds this value, no points in it have motions in reverse linear direction. All points in the body have displacements only in forward direction. Requirements that points in a rotating body on opposite sides of centre of rotation have motion in opposite directions are no more satisfied. No point in the body has circular/elliptical path in space. All points in the body move in forward linear direction only. However, with respect to any point in the body, all other points in its plane of rotation, appears to move in circular path around the point of reference.

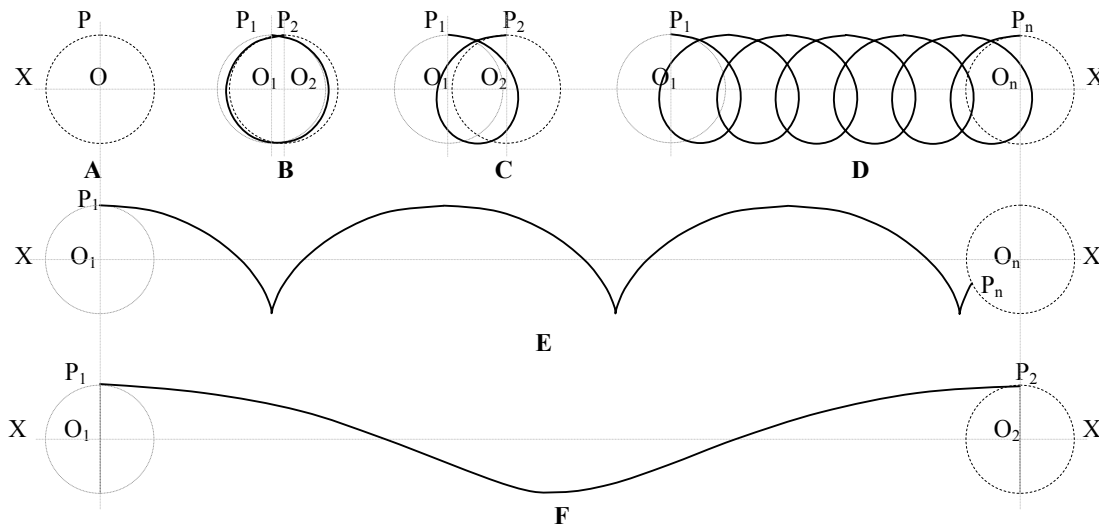


Figure 1

As linear speed of rotating body is increased, circular path of peripheral point expands to become a wavy path about line of motion of the body’s centre of rotation. Black curved line, ‘F’, in figure 1, shows this path. Path of peripheral point in space traces a wavy curve from  $P_1$  to  $P_2$ , while the centre of rotation of the body moves from  $O_1$  to  $O_2$  along line XX, during one rotation of the body. At lower linear speeds, difference between segments of curved path (on either side of the linear path) is large. As linear speed of rotating body increases (for the same rotary speed), lower segment becomes larger and differences between upper and lower segments of the curve reduce.

Although, depending on body’s linear speed in relation to its rotary speed, a peripheral point traces curves of loops, semi-circular curves or wavy path in space, it still moves in a circle with respect to centre of rotation of the body. Motion of peripheral point in a circular path is apparent only to an observer situated at centre of rotation of rotating body. Circular path of a peripheral point, noticed by observer, is an illusion due to the observer not considering his own linear motion in space. In fact, every point in the rotating body, moving in linear path, appears to move around every other point in the same body. This is a false impression, created by choosing a moving point as a (steady) reference. Every point has its own independent path in space. Other than when rotating body has no linear motion, paths of peripheral points do not trace closed geometrical figures in space.

For an observer, situated at one of its peripheral point, centre of rotation of the body will appear to move around his location. He cannot observe his own true motion in space. He also cannot observe linear

motion of the rotating body (centre of rotation). Observed motion of centre of rotation in a circular path around a peripheral point is an illusion.

Since both, apparent motion of peripheral point in circular path around centre of rotation and apparent motion of centre of rotation in circular path around peripheral point are only illusory motions; no true physical law can be based on them. Such illusory motions cannot be considered as proof of scientific laws. Observers, situated at both these points will have simultaneous apparent motions contrary to each other. None of them can observe true motion of their points on the rotating body, in space. Real paths of any point on a linearly moving-rotating body can be viewed only from an external point. Origin of frame of reference has to be outside the body.

A rotating body's integrity keeps relative positions of its peripheral points with respect to its centre of rotation. Its integrity provides certain attachment between these points. All through their displacements, distance between centre of rotation and a peripheral point remains constant. Each of these points can appear to move in circular paths around other points. Therefore, in any system of bodies, where distance between reference and referred bodies is always kept constant (by some means irrespective of bodies' motions) and where each of the bodies appears to move in circular path around each other, above given explanations are valid.

### **Orbital motion:**

A planetary system is formed by a group of large bodies in space. Bodies of this group move together along a median path, while individual bodies have independent relative motions within the group. Planetary system that includes sun and its planets is solar system. Path of each body in this system is affected by presence of all other bodies. We may, for the time being, neglect effects on their paths by presence of other bodies in space, as they are very small. There may also be smaller bodies called satellites in a planetary system. Satellites being very near to planets, they form (sub) planetary system with their mother planet, within the larger planetary system. Largest body in the group has its path nearest to median path and its path is least perturbed. This body acts as the leader of the group and it is called central body of the planetary system. All other bodies in planetary system move along with central body, while their paths are perturbed by presence of all other bodies in the system. For explanations below, we shall consider a planetary system containing a central body and one planetary body.

A planetary system is essentially a part of a galaxy. All stable galaxies are static in space [1]. Galaxies are rotating systems of macro bodies with no translational motion. Hence, a planetary system in a stable galaxy traces a path around galactic centre. Median path of a planetary system is very large around galactic centre.

With reference to a planetary body, central body appears to orbit around planetary body and with reference to central body, planetary body appears to orbit around central body. Disregarding eccentricity of an orbit, distance between central body and a planetary body remains constant. By these characteristics, a planetary system functions as a linearly moving rotating body. Planet takes the place of a peripheral point and central body takes the place of centre of rotation, in explanation given above paragraph on 'linear motion of a rotating body'. Median path of a planetary system is a very large circle. A small part of this very large circle is considered as a straight line for this explanation.

### **Real orbital path:**

With respect to absolute reference, a planet does not orbit around its central body [2]. Path of a planet's motion is wave-like, along central body's path, with the planet periodically moving to front and to rear of central body. In figure 2, path of the central body is shown by the arrow in grey dotted line. This curved path, also, is wavy to a smaller extent, curving in same directions as path of the planet. Arrow in black wavy-line shows planet's orbital path. Unevenness of curvature of this path on either side of central body's path (in the figure) is due to different scales used linear and radial displacements. Path of a satellite of a planet is a wavy-line about planet's path. Central body and planet are shown by black circles and their future positions are shown by grey circles. In this sense, it can be seen that a planet (or a satellite) orbits around the centre of the central body's curved path and wave pattern in its path is caused by presence of central body. In reality all bodies in a planetary system (including satellites) are free bodies and they have their own individual paths in space. Changes in the path of a free body may be attributed to perturbations caused by presence of nearby bodies. These perturbations look like orbital motion around a central body,

only when they are referred to an assumed static central body in a relatively small system of bodies. This argument can be carried further to show that with respect to absolute reference there is no natural orbital motion around central bodies at all, except orbital motions of bodies around (static) galactic centres [1].

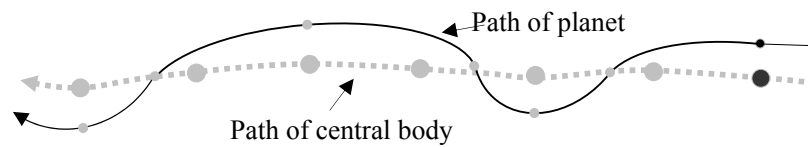


Figure 2

As a planet moves in its orbital path, its relative direction to central body changes through half a circle, alternately in either direction. This is in contrast with present assumption of a planet moving around the central body in full circles (an assumption created by change of reference frame). Changes in relative direction between bodies cause variations in efforts and their actions.

Although it is not generally acknowledged, shape of a planet's orbital path is wavy about the path of central body. Both, a planet and its central body move in the same direction about same median path in space. Acceptance of wavy-nature of planetary orbital paths can give simpler and logical explanations to many of the puzzling problems in cosmology, like; formation of planetary system, coplanar locations of bodies in a planetary system, mechanism of planetary spin, higher spin speeds of equatorial region of certain planetary bodies, displacements of tides from local meridian, precession of elliptical apparent orbits, apparent lengthening of solar days, etc [1]. All assumptions, based on elliptical nature of planetary orbits will become invalid.

Figure 3 shows real orbital paths of sun, earth and moon. Orange circle shows the sun and the orange arrow shows sun's path as a straight line (very small part of its circular path). Green circle shows earth and curved green arrow shows earth's real orbital path for five lunar months. Blue wavy arrow shows real orbital path of moon. Black dashed circle around the sun shows apparent orbit of earth. Black circle in

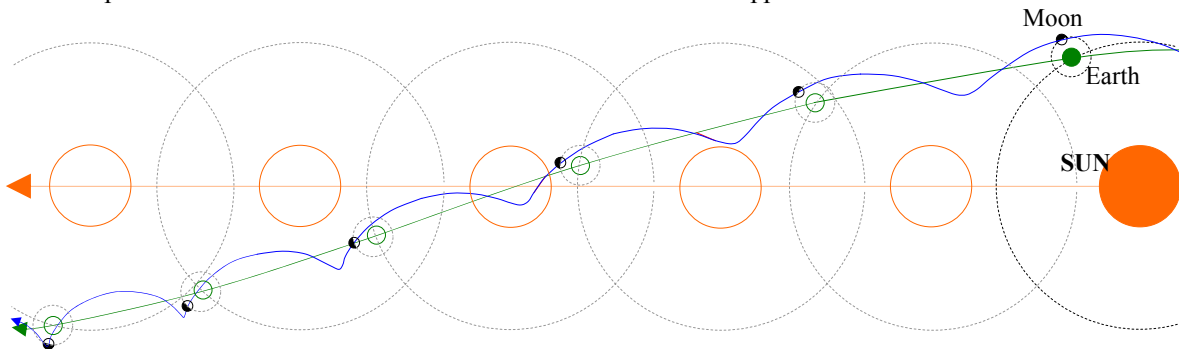


Figure 3

dashed line around earth shows the apparent orbit of moon around earth. Lower parts of real orbital path of moon about earth are narrower because of very small scale of distance chosen. Relative positions of sun, earth and moon are shown as for full moon days. Dim figures to the left show their relative positions and apparent orbits for subsequent full moon days. Eccentricities of the apparent orbits are not considered. Real orbital paths of all satellites about their corresponding planets are similar.

### Apparent orbital path:

As recently as few centuries ago, earth was believed to be the centre of universe. All other observable celestial bodies were assumed to revolve around earth. Developments in geometry and mechanics made this belief irrational. Attempts to depict paths of even the nearest celestial bodies were unsuccessful or illogical, until Johannes Kepler formulated his laws on planetary motion (by analyzing observations by earlier astronomers) in year 1609 AD. First law states that '*All planets move about the Sun in elliptical orbits, having the Sun as one of the foci*'. First law gives the shape of the orbital path and the second and third laws, which depend on the first law, give mathematical properties of this path.

Shapes of planetary orbits were categorically stated as elliptical. (Circle is a special case of ellipse).

Neither why such motions should take place nor a mechanism of planetary motion were proposed by these laws. Choice of location of sun, out of two foci of the ellipse, was also not explained. In short, Kepler's laws were formulated on the basis of empirical evidences only. They had no scientific base. Planetary orbital paths were depicted as they would appear to an observer, placed on static Sun. These were later assumed as true paths of planets in space.

While formulating his laws on planetary motions, Johannes Kepler used observations only for few planets in solar system. Although, moon is the nearest celestial body to earth and its orbital path was much easier to observe, it was left out. Probably, due to realization that moon, a satellite, could not execute an elliptical orbit around moving earth. His planetary laws are applicable only to observed orbits of planets around a static sun. Observed orbital paths are what the observer sees, without considering his own state of motion. An observer, placed on a static sun will see all planets in solar system orbiting around Sun. Similarly an observer in any of the planets will observe all outer planets and the sun orbiting around him. Standing on earth, we see that sun, outer planets and moon orbit around us in complicated geometrical paths. All these orbital motions are mere appearance. Elliptical orbital motion is apparent only with respect to participating bodies.

Apparent planetary orbits can be assumed around any reference point, within a system. Since we consider instantaneous parameters of planetary bodies, for most of all practical purposes of predictions (of annually) re-occurring phenomena, apparent orbits (relative positions) provide accurate results. Although most astronomers are aware of apparent nature of elliptical orbital paths, they still seem to consider apparent orbit as true orbital path of a planet. Kepler's laws on planetary motion and elliptical planetary orbits are routinely used in conjunction with many multi-body problems including moon's orbital path, which was not considered for in original planetary laws. Although mathematical treatments of apparent actions may produce results that suit apparent phenomena, they cannot always describe real facts.

We must consider that Kepler's 'laws of planetary motion' were formulated at a time, when phenomena of 'gravitation' and 'central force' were unknown. At that time, even heliocentric nature of solar system was not an accepted fact. What Kepler has done is to formulate laws to suite observed locations of planets about a static sun, in space. No interactions or efforts between central body and planets were considered as cause of their relative motions.

Kepler's laws on planetary motions came into prominence and were widely accepted after they were used to verify and establish Newton's 'laws of motion' and the 'law of universal gravitation'. Newton's theories provided the much needed cause and an imaginary mechanism for planetary orbital motion around a central body. Belief in elliptical planetary orbits around their central bodies played a crucial role in establishing current theories on motion. Power of these laws to explain and predict various phenomena (with respect to relative positions) were confirmed later. This made Newton's 'laws of gravitation' and 'laws of motion', the foundations of quantitative mechanics; all the while forgetting that mathematical treatments, used for their validation, are apparent planetary orbital motions, as observed around an assumed static central body and not true orbital paths of planets in space, about their central body.

Since elliptical orbital motion is an apparent phenomenon, either of the bodies can be considered as central and the other as its planet. Planetary laws are equally valid in either case. Although it is generally stated that earth orbits around sun in eastward direction, it is equally valid to state that "sun orbits around earth in westward direction". However, when more than two bodies are considered as a single system, it is more convenient to take the common and most prominent body as the central body and to take other bodies as planetary or satellite bodies. Earth, orbiting around the sun, is considered true in a heliocentric universe. Although we now know that, the sun is no more a static body at the centre of universe; our view of planetary orbits in a heliocentric solar system has not changed.

A planetary body moves in the same direction and along with its central body. It is only when we imagine reversing the direction of planet's motion, on one side of central body's path, we can get a geometrically closed figure for planet's apparent orbital path. This is something we unintentionally do. It coincides with our observations and general beliefs. It is a good assumption to have definite reference points on planetary orbital paths, to predict cyclically varying phenomena. Even with these manipulations, shape of an apparent orbital path is oval with a single focus rather than an ellipse with two foci [2].

Apparent orbit is a small part of larger real orbital path, between two identical appearances of central body, looking from the planet (e.g.: one solar year). It is an imaginary concept, where shape of path, speed

of planet and directions of motions are manipulated to suit observations. As such, it has no logical basis. It depicts appearance of a system, where it is assumed that the central body by some imaginary mechanism (change of reference frame) is held stationary at the centre of apparent orbit and the planet is moved at a (constant) linear speed by an equally imaginary mechanism.

Only cause of actions within a planetary system is ‘central force’, due to (apparent) gravitational attraction, which accelerates a planet towards centre of apparent orbit – the central body. Parameters of this action are mathematically manipulated to produce the required orbital motion around a central body that matches observations. While doing this, much greater motions of planetary body before it became a planet and motion or path of central body are ignored. An apparent orbit is convenient to predict cyclic features that take place annually. However, taking an apparent orbit as path of real motion of a planet is highly illogical and incorrect.

Apparent orbits, determined by using (static) barycentre method, are also circular paths around centre of mass of two bodies. Even relativistic mechanics subscribe to planetary orbital paths around central bodies. It suggests curvature of space near a massive body as the cause of planetary orbits rather than an attraction between planetary and central bodies.

Figure 4 compares real path of an orbiting body and its apparent orbit for duration of one apparent orbital period, according to Kepler’s laws of planetary motion. Black central line shows central body’s path. Grey, wavy line is path of the planet. Larger black circle shows central body and circles in dotted line show its future positions. Small black circle shows orbiting body and grey circles show its future positions. Double headed arrows show central force between the bodies at various positions as they move along their paths. As a planet moves, its apparent orbit moves along with central body.

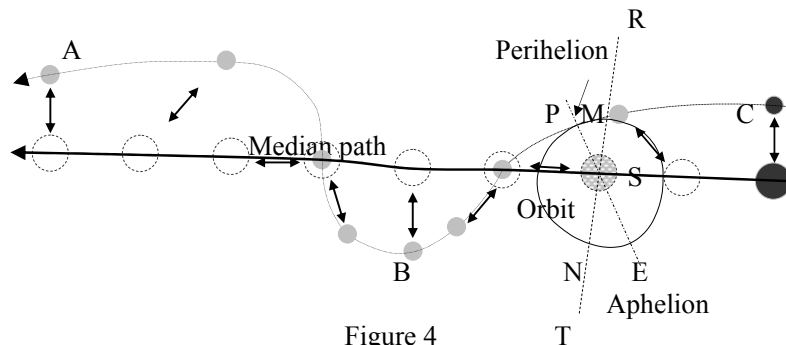


Figure 4

Apparent orbit of the planetary body, when it is at position P with central body at S, is shown by the oval in figure 4. Planet’s perihelion is at P and aphelion is at E. In real motion, highest and lowest linear speeds of the orbiting body occur, when it is at  $90^\circ$  away from the path of the central body, at M and B, respectively. All parameters of an apparent orbit and orbiting motion are related to perihelion and aphelion. From its position at C, until B, orbiting body is in front of central body and hence it is retarded in its linear motion. From B to A, orbiting body is behind the central body and hence it is accelerated in its linear motion. Line RST is the radial line connecting central body to centre of its curved path (galactic centre). Acceleration and deceleration of the planet change over at points M and B. These points are fixed relative to path of central body.

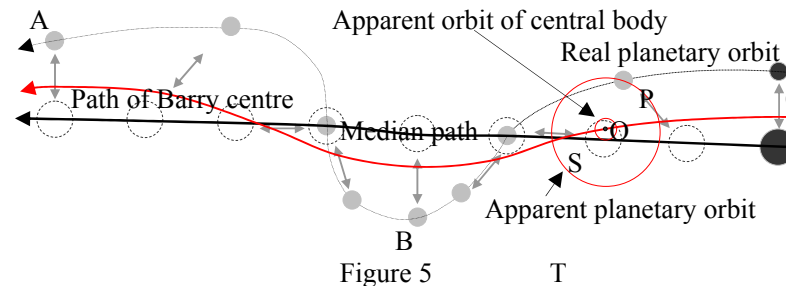


Figure 5

Figure 5 compares real path of an orbiting body and its apparent orbit for duration of one apparent orbital period, according to barycentre method. Black central line shows central body’s path. Grey, wavy line is path of the planet. Larger black circle shows the central body and circles in dotted line show its future

positions. Small black circle shows orbiting body and grey circles show its future positions. Double headed arrows show central force between the bodies at various positions as they move along their paths. Wavy red arrow shows path of centre of masses (barycentre) of these bodies. Barycentre moves along red wavy line carrying apparent orbits of both central and planetary bodies.

Apparent orbit of planetary body, when it is at position P with central body at S, is shown by larger red circle. Apparent orbit of central body is shown by smaller red circle. From planetary body's position at C, until B, orbiting body is in front of central body and hence it is retarded in its linear motion. From B to A, orbiting body is behind central body and hence it is accelerated in its linear motion

### Three body problem:

Derivation of apparent orbits for a system that has two bodies in it is understood as 'two body problem'. From above explanations; an apparent planetary orbit is an ellipse around its central body. Description of apparent orbit of a planetary body around its central body (in a system of two free cosmic bodies, where the system as a whole has no translational motion in space) is based on definite requirements (as assumptions). They are summarized below with their unsuitability for three (n) body problem.

If a system has more than two bodies in it and we wish to simultaneously derive apparent orbits for each of the bodies, it is called a three (n) body problem. Despite above given definite assumptions for specific purpose of two body problems, many physicists carry forward same assumptions while attempting solve three (n) body problems. This is very much against requirements elicited above for two body problem.

1. There are only two bodies in consideration.

As there are more than two bodies in a system, methods used for two body system cannot be used for three (n) body problem.

2. Central body of the planetary system or barycentre of bodies is stationary in space.

Each apparent orbit has a central body. Hence, at least one body in three body (or more bodies in n body) problem has to act simultaneously as central body as well as a planetary body. This is an impossible goal.

3. In Kepler's method, only the planetary body traces an apparent orbit. In barycentre method, both, central and planetary bodies have apparent orbits around their centre of mass.

While apparent orbits of all planets in a planetary system are with respect to the same central body, each planet has its individual apparent orbit and it is derived from separate sets of parameters. Hence each pair in a three (n) body system has to have separate central bodies. This requirement is not fulfilled. Although many bodies may have single centre of mass, barycentre, used for apparent orbit, is the point between two bodies (where they balance each other) around which both bodies orbit about each other. This function cannot be fulfilled in case of systems with more than two bodies.

4. There can be only one central body in a planetary system. Other body(ies) is(are) planetary body(ies) that traces apparent orbit(s).

As there are more than two bodies in a three (n) body system, two or many central bodies are required in three body (n) problem. This is another impossible goal.

5. Apparent orbit is derived from relative parameters of a planetary body with respect to its central body.

As there are more than two bodies in a three (n) body system, planetary and satellite bodies cannot have relative parameters (required for apparent orbit) with the same central body.

6. Direct relation is only between two objects.

Relation of a third object can be established indirectly through its separate direct relations with the other two objects. Hence, a third body (in three body problem) does not have an apparent orbit with two other bodies, simultaneously. To search for one is to no avail.

Almost none of requirements for deriving apparent planetary orbital paths in two body problem are fulfilled in proposed three body problem. Unless three body problem has its own set of requirements and a special method to derive apparent orbits of member bodies, no such problem can exist, in current state of physics. However, creating fictional problems and solving them by mathematical manipulations is often appreciated by scientific community. Perseverance on the part of many scientists to find a mathematical



solution to this non-existent problem yielded no comprehensive results yet. Raising a non-existent problem and qualifying it as ‘unsolvable problem’ or ‘unexplainable physical phenomenon’ is an attempt to mystify physics. Mysterious aura about physics may appeal to many, so that the subject will be reserved for few and others will be compelled to believe in its divine nature.

Unlike apparent planetary orbits, real orbital paths require no assumptions. Hence, real orbital paths of any number of bodies may be derived from their true parameters. Only difficulty to derive real orbital path is to specify initial conditions accurately, without an accepted absolute reference. Until we can define an absolute reference, apparent planetary orbital paths derived by considering relative parameters (which helps to predict cyclic events) may be used to specify their relative positions and associated phenomena. However, it may be borne in mind that apparent orbits give accurate results only with respect to relative positions of bodies in a planetary system and nothing else.

## Conclusion:

Assumptions used to derive apparent planetary orbital paths in two body problem are unique for it. They are not suitable, when number of bodies in a planetary system exceeds two. As long as a different set of assumptions are defined, separately for deriving apparent orbits in planetary systems that has more than two bodies, three body problem cannot exist. Assertion that non-existent three body problem exists and declaring it as an ‘unsolvable problem in physics’ is a deception to mystify physics.

## References:

- References [1], [2] and [4] are self-published by the author. They are neither reviewed nor edited.
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