Dark matter – a miscalculation

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Objective

This essay is a brief demonstration and explanation of the facts described in the following papers:

- ✓ The many-body problem of the galaxy calculation and the Virial theorem (Krause, 2005c)
- ✓ Comparison of integral and discrete calculations of the galactic mass determination (Krause, 2005a)
- ✓ Gravitational forces in a sphere and a plane (Krause, 2005b)

In addition, two different calculation possibilities of the gravity field in a galactic plane are analyzed. The results (masses M, radiuses r, force F and orbital speeds v) of both calculation possibilities are compared and discussed.

On one hand, the integral calculation of masses and orbital speeds in a galactic plane, which has been used since the times of Sir Isaac Newton, leads to the assumption of dark matter. The discrete calculation, on the other hand, is executed to verify the results of the integral calculation.

1. Fundamentals of the calculation
2. The calculation of gravity in the center oriented, integral calculation model according to Newton (Alonso & Finn, 2000)
3. The calculation of gravity in the measuring point oriented, discrete calculation
4. Results of the comparison of the two calculation methods for the determination of gravity in a galactic surface
5. Further application of the discrete gravity calculations
   (Gravity lenses and problems of pioneer probes)
6. Summary

Dark matter - a miscalculation

1. Fundamentals of the calculation

The calculation of strengths, masses and orbital speeds in the galactic field can always be considered a many-body problem, since a galactic surface is composed of thousands of suns and other masses.

The two possibilities to execute a calculation of gravitational forces in a galactic field are

- ✓ The center oriented integral calculation, which only considers masses on the inside of the field. Sir Isaac Newton introduced this form of calculation. It is currently the most frequently used method. In order to determine gravitational forces, only masses within a visual orbit around the galactic center are combined to one mass point P and used for the calculation.

- ✓ The discrete measuring point oriented calculation utilizes numerous gridline based single calculations by a computer program. In this program the single results are combined and converted into the respective parameter (mass, orbital speed, and radius). Unlike the integral calculation, the discrete calculation uses inside as well as outside masses of the visual orbit of P. The discrete calculation requires a rotation symmetrical gridded galactic field model with 10 measuring points. Each square in the grid is equal to a mass point (all together 357 mass points in this example).

It is expected that both calculation methods of the model deliver comparable results. Nevertheless, a certain deviation is expected from the discrete to the integral calculation, but it should clearly be in the low one digit percent area, for example 1%.

2. The calculation of gravity in the center oriented, integral calculation model according to Newton (Alonso & Finn, 2000)

All formulas, that involve gravity, apply only to point masses and never to field or volume masses. Even Newton was unsure if point masses and volume masses can be treated equally, and postponed his publications about gravity for almost two decades, until he had found an explanation with integral calculations. The attraction between masses can be determined with the formula

$$F = \frac{\gamma \cdot m \cdot M}{r^2} \qquad \textbf{(F 1)}$$

All formulas concerning gravity are valid for both point masses and spherical bodies as long as they are rotation symmetrical. Spherical bodies can indeed be regarded as point masses when only masses that lie within the orbit of point P are taken into account. The masses outside this orbit are not taken into consideration.

M and r are therefore predetermined and always refer to the center of the circle. Hence, F and v can be calculated.

Due to similar circumstances in a plane and a sphere, the formulas can be used for the accumulation of masses on a plane surface. The orbital speed of a mass is calculated with the formula (Masso, 1995):

$$v = \sqrt{\frac{G \cdot M}{r}} \approx \frac{1}{\sqrt{r}} \qquad \textbf{(F 2)}$$

Solving for M:

$$M = \frac{v^2 \cdot r}{G} \qquad \textbf{(F 3)}$$

According to repeated measurements, the circulation speed of individual masses in the galactic plane is virtually constant. This makes obvious that at an unchanging speed, the mass M only changes with its radius. If the speed is steady and the radius changes from 1 to 10, the mass also increase by the factor 10. The measured orbital speeds in the galactic plane are virtually steady at 225 km/sec. away from the center toward the visible edge of the universe and further. With constant orbital speed, the mass of in a galaxy has to grow according to the above formula with an increasing radius. Contrary to this logic, however, the mass decreases in the visible area from the center to the edge of a galaxy.

This discrepancy between logic and fact caused the invention and acceptance of dark matter in order to explain and guarantee the galactic orbital speeds.

3. The calculation of gravity in the measuring point oriented, discrete calculation

A fundamental consideration of the discrete calculation can uncover to new base points. Assuming that gravity in the center of a two dimensional point symmetrical body is canceled, the force on a point P outside of the center is difficult to calculate with integral formulas.

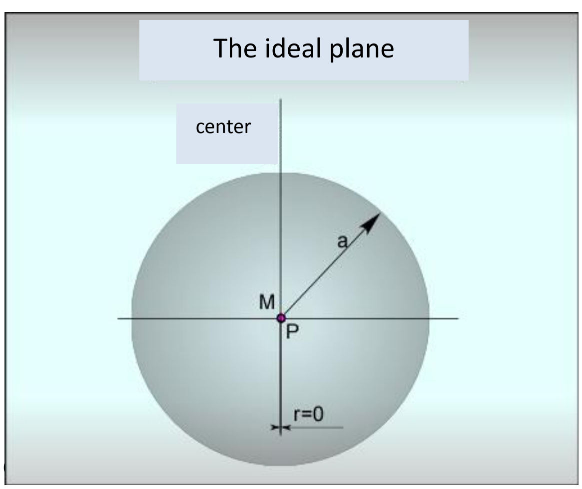
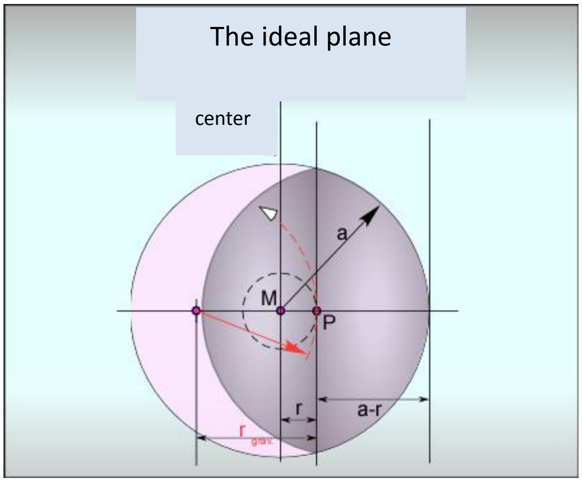


Figure 1

Gravity in the center of a homogenous massive plane with even mass distribution equals zero, because the masses surrounding the center cancel the gravitational effects of those on opposite side, as long as the masses are equally heavy and at the same distance from the center.

With the consistent application of this fundamental realization in observation and discrete calculation, point P is subject to the following forces. (The values for the radius and mass are changed compared to the integral calculation method.)

Figure 2



If point P moves out of the center of the body toward the edge, the gravitational forces influencing P remain the same, as long as the masses around P remain at the same distance with an equal mass. Point P is the center of a lens shaped point symmetrical body (purple area). The subtraction of the lens shape around P, only a sickle shaped body remains to influence the gravitational forces on P.

The integral calculation method of determining the gravity in point P only considers the radius of the whole shape. However, once point P moves, the radius needs adjustment. In addition, the mass of the sickle shaped surface is different from the whole circle. Consequently, integral calculation of gravitational forces using the initial radius and mass are insignificant for the discrete field calculation.

Masses are only affected by forces that influence them from a distance – integral calculations fail to determine these forces correctly.

The radius r of the center oriented integral calculation turns into r_{vis} because the inner orbit of the point P is nothing more than a visual orbit – a form of libration track as a consequence of the real gravitational orbit. A body's galactic libration orbit is characterized by the lack of mass in the visual and actual center that could exert gravitational forces (Institut fuer Raumfahrtsysteme, n.d.).

Even the center of gravity of sickle shaped body is difficult to determine, as the masses within are not symmetrical or at the same distance to the center. A thorough explanation of the mass calculation can be found in the paper *The many-body problem of calculating a galaxy* (Krause, 2005c), which should be read together with this paper.

The individual mass points of the sickle shaped surface are combined to a pivot point with the distance r_{grav} from point P (marked red in *Figure 2*). The masses of the mass points are not taken into consideration at this point. After calculating the forces within the sickle shaped surface via discrete calculation, the conversion into corresponding mass equivalents is possible:

$$F \text{ in } F_{grav.} \qquad r \text{ in } r_{grav.} \qquad \text{and} \qquad M \text{ in } M_{grav.}$$

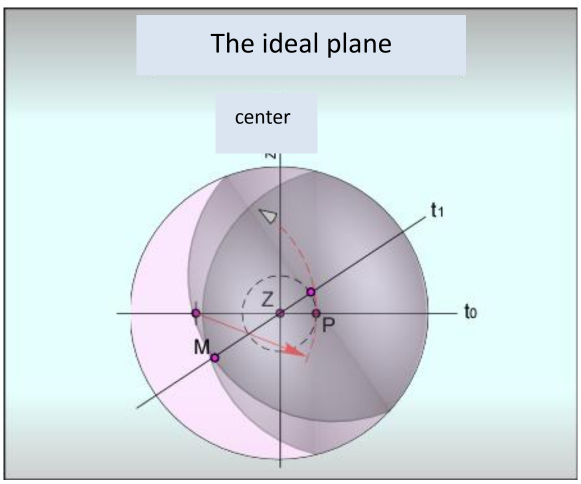
$$M_{grav.} = \left(\frac{F \cdot r^2}{\gamma \cdot m} \right) = \frac{F_{grav.} \cdot r_{grav.}^2}{\gamma \cdot m} \qquad \textbf{(F4)}$$

The mass $M_{grav.}$ (as equivalent), the radius r_{grav} from the combination of single calculations, and the gravity $F_{grav.}$ can be determined with the help of F4.

If point P is left to rotate (from t0 to t1 etc.), it orbits around the mass-free center of the surface on a liberation track (*Figure 3*, the dotted circle).

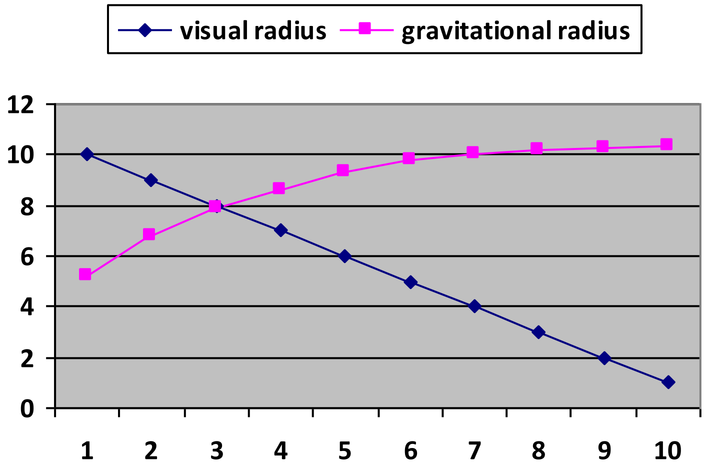
Figure 3

The masses around point P appear to rotate as well, which is caused by some masses losing their gravitational influence on P, while others are beginning to exert gravitational forces (a real movement of masses is insignificant). This area of gravitational force rotates around the center at the same speed as point P. The gravitational force of the sickle shaped area on point P is easily calculated with the discrete method, as long as the distance to P (red arrow as radius) and the mass are know. Nevertheless, determining the radius or mass with the gravitational force or circulation speed is impossible, because two variables of the equation are unknown. However, if the visual radius is used for the calculation, the result for the mass is only fictitious, for P moves along a libration track, not a common planetary orbit. The calculated fictitious mass cannot be used to make any statements about the real mass distribution of the surface. Hence, the only correct way to determine the mass of the sickle shaped area is through trial and error until the calculated orbit speed matches the measured value (this also applies to spheres).



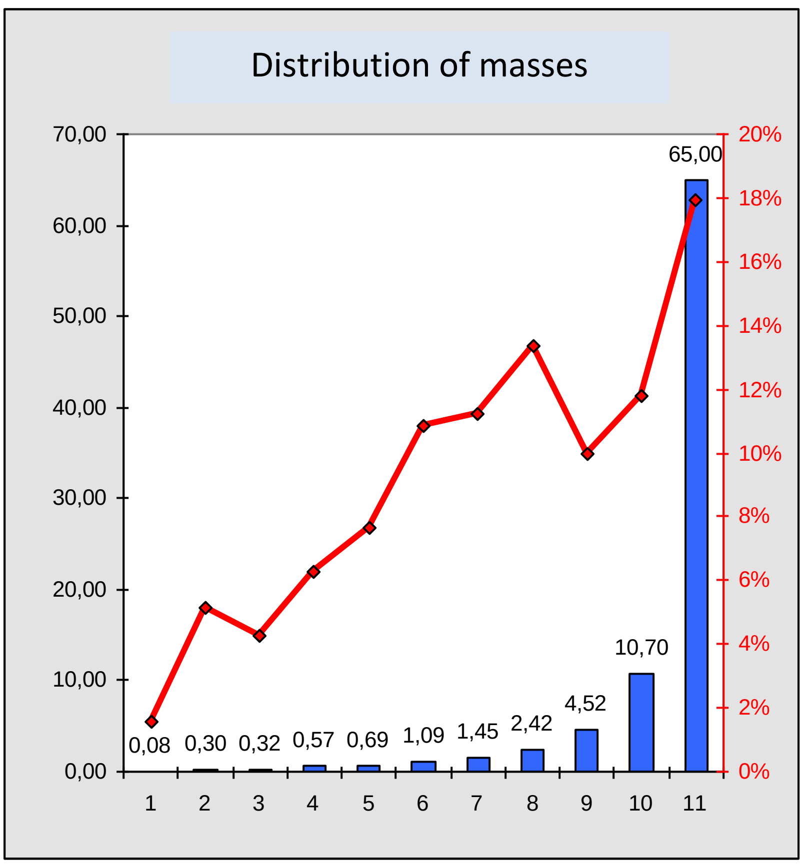
A comparison between integral and discrete calculation of the radius with a constant mass shows the spectrum of possible error. Not only do the values differ, they are opposite.

Figure 4



The blue curve represents the radius determined with integral calculation, and the red curve shows the radius determined with discrete calculation. The application of discrete calculation to a visible mass distribution, as described in Oort (1938), leads to results illustrated in *Figure 6*. *Figure 5* shows the mass density that results in the values found in *Figure 6*.

Figure 5



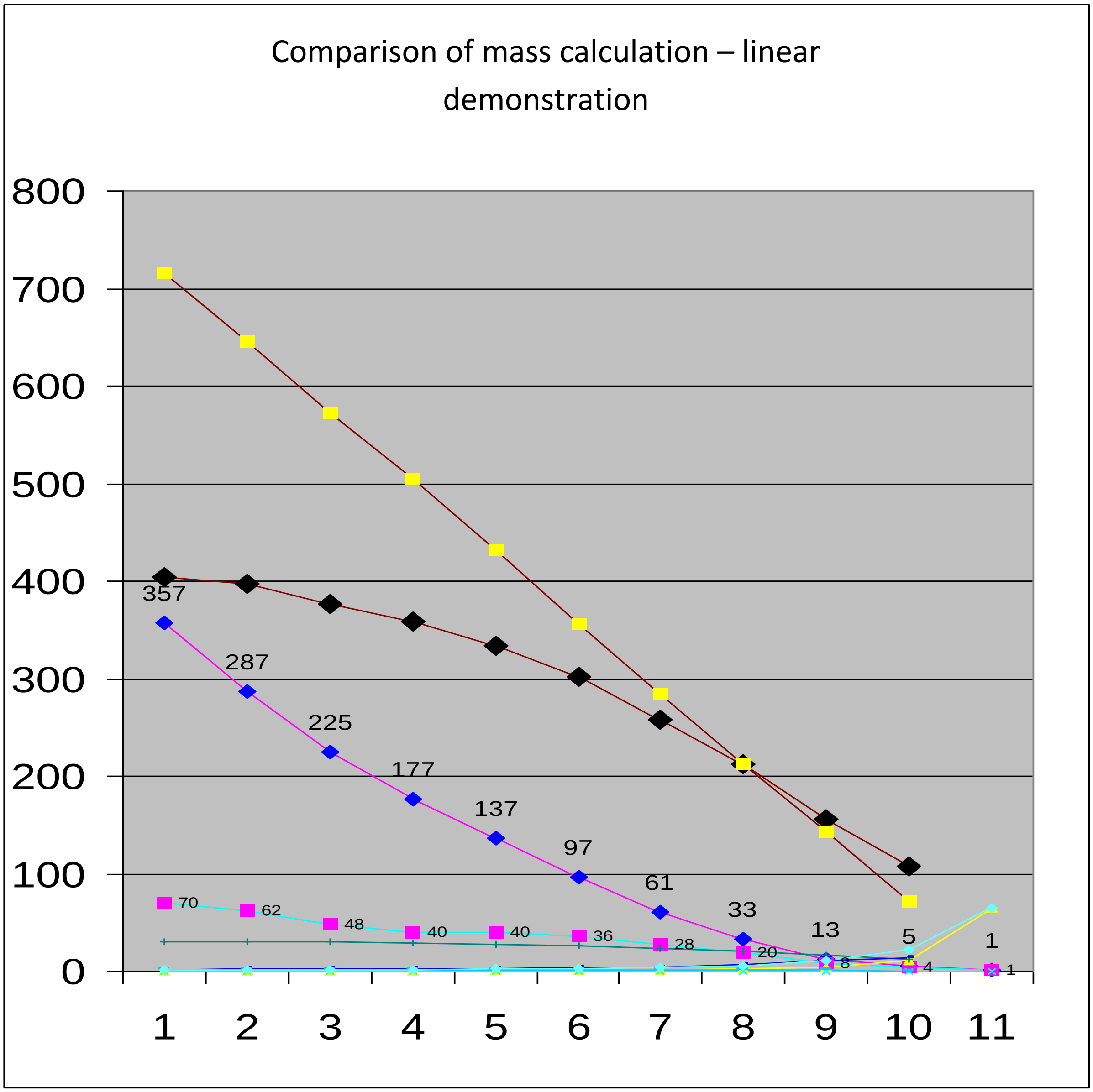
Displayed is the mass density of a galaxy, starting in the center (to the right) toward the left edge. The blue columns represent the visual mass distribution found in Oort & Plant (1975). The orbital speed of mass points around the center remains constant according to the results of discrete calculation. *Figure 5* fails to show the combined mass of a galaxy – only the mass density or mass distribution within the galactic field are recorded.

The red curve illustrates the percent of mass in the single circle segments in comparison to the entire galaxy mass.

When applying discrete calculation, the visible distribution of mass in a galaxy is sufficient in obtaining the even rotation curve measured in reality. An additional, invisible mass is unnecessary.

To reach an even rotation curve, different masses in addition to different radii are necessary for either of the calculation methods. This is demonstrated in *Figure 6*.

Figure 6



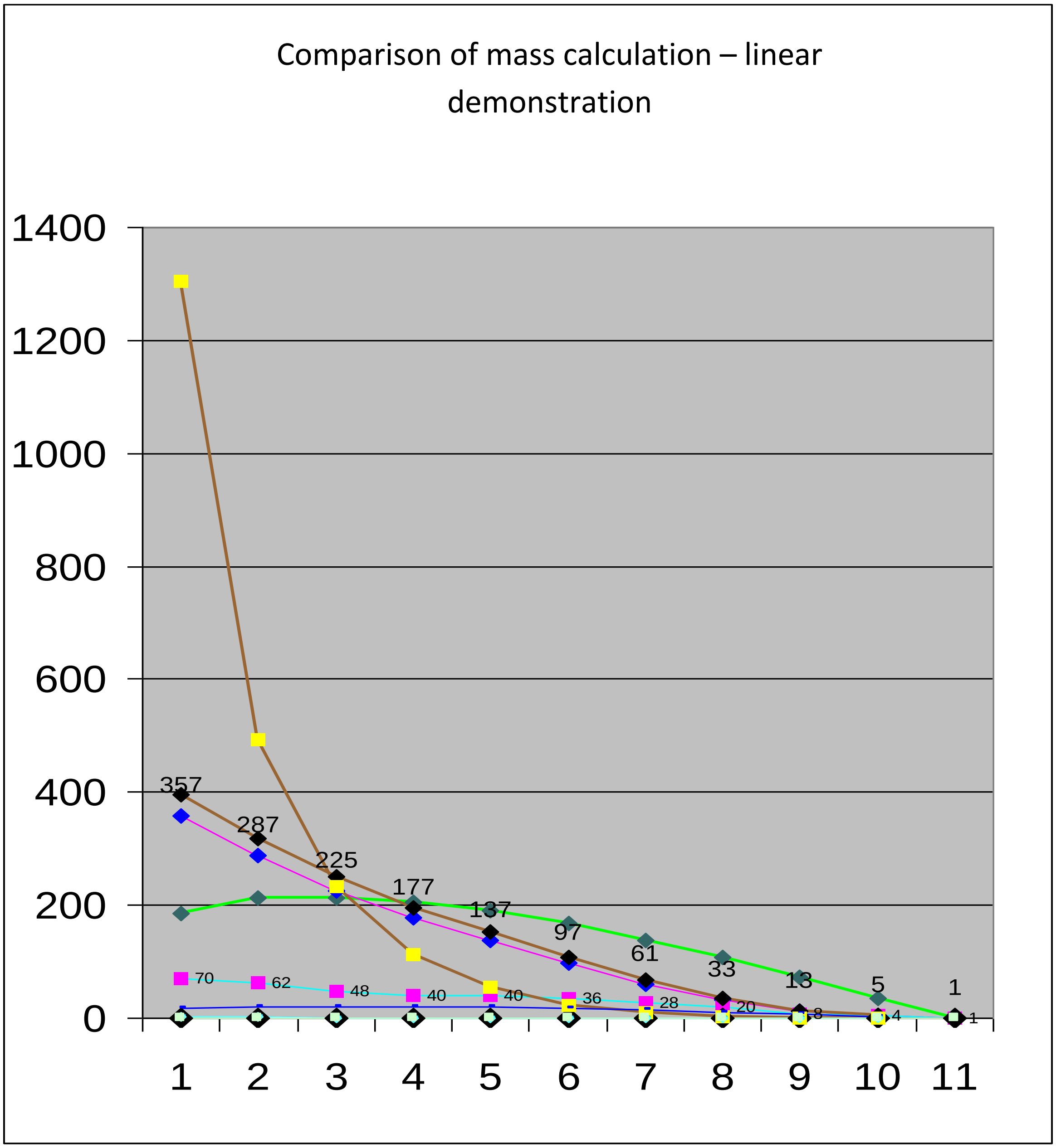
The basis for all curves is an equal orbital speed within the entire galactic plane.

- ✓ The lowest curve (blue with purple markers) shows the number of mass points per round plane. These measurements are independent form any calculation, because they are predetermined by the grids used for discrete calculation.
- ✓ The pink curve shows the increase of points beginning in the center (to the right) over to the edge of the plane. The curve is equal to the surface increase of the plane toward the edge. This curve is independent from the calculation as well, and serves as a reference.
- ✓ The brown curve with black markers represents the mass quantity of individual mass points multiplied with the mass density found in the literature. This is equal to the visual masses within the galactic plane. The first marker on the left represents the combined mass of the galaxy. The other points show parts of the combined mass that are determined by the addition of the gridded plane surfaces. However, only the total mass forms the base value for the discrete calculation of the circulation speed.
  Explanation: the addition of a mass point with the density 65 (*Figure 5*) in the center with four mass points with the density 10.7 results in the sum 107.8. The first black marker represents this value. As the starting points cover only parts of the galaxy, an increase in mass of the whole galaxy toward the edge should not be concluded.
- ✓ The brown curve with the yellow points represents the mass of the galaxy determined with the constant visual orbital speed and integral calculation. The curve is equal to the typical, linearly rising mass representation that is postulated in the numerous works about dark matter, according to which the mass of a galaxy increases linearly with the radius. In this context, scientists only refer to the *mass* of a galaxy, even though *partial masses* of the entire galaxy close to the center are rather small and increase in size toward the edge of the galaxy. The calculated combined mass of the galaxy is located on the left side of *Figure 6* with 715 mass units. The yellow mass point close to the center, on the other hand, is one tenth of this value with 71.5 which is caused by the distribution of ten predetermined measuring points from center to edge. If the number of measuring points is increased, the mass ratio changes accordingly.

The proclamation of inner fraction of total masses (10%, 5%, or even 1% of total mass) as the total mass of the galaxy leads to the misconception that 90%, 95%, or even 99% of the galaxy consists of dark matter. Even though this is common practice in the literature, incomparable values are compared, as the increasing number of mass points is added to the mass calculation. Hence, this form of calculated dark matter is caused by an error in perception or illustration. The real mass of a galaxy with 405 (black marker) and the mass of 715 (yellow marker) calculated with the integral method differ by the factor 1.765 – not 10.

Another comparative examination of the integral calculation method can be used to verify the resulting increased mass value. If the integral calculation of mass values with a homogenous mass distribution of one per mass point differs from the calculation of mass through the orbital speed, the integral method is rendered useless. The same applies to the curve with the discretely determined mass values, as shown in *Figure 7*.

Figure 7



The mass values of the discretely calculated masses are similar to the sum of points on a plane. (The deviation of almost 10% was evoked by a deliberate falsification, to keep both curves visible in the graphic.) The brown curve with yellow markers illustrating the integral calculation of mass values cannot be brought into unison with the predetermined masses. While the deviation amounts to 264% of the real masses in the edge area, the results close to the center fall below the values of real masses. In addition, the calculated results are different from the previously determined values (factor 1.765 of the total mass).

Clearly, the integral calculation of galactic masses does not lead to consistent results. One could object that dark matter only manifests itself in galactic magnitudes; however, even with mass values found in space, the results of integral calculation are wrong.

Figure 7 also shows the results of a discrete mass equivalent calculation (green curve) which are similar to the real mass values.

4. Comparison of the two calculation methods for the determination of gravity in a galactic plane

The use of integral calculation methods with the visual speed of masses orbiting the center of a galaxy on libration tracks inevitably lead to errors in determining the mass of a galaxy. The results of such faulty calculations often lead to the assumed existence of an invisible dark matter (Krause, 2005a).

Gravitational forces

According to the discrete calculation, the gravitational forces outside of a homogenous plane decrease exponentially for a point P. Even though a decrease of forces can be determined with integral calculation as well, the results of the two different calculation methods differ, unless they are applied to a mass sphere model. Nevertheless, what is applicable to a sphere cannot be transferred to a flat plane.

In the discrete calculation method the center of gravity in a plane is closer to the point P than its actual center. Consequently, the gravitational forces at the point P are much bigger. The following graph illustrates the difference in gravitational forces between the two calculation methods.

Figure 8

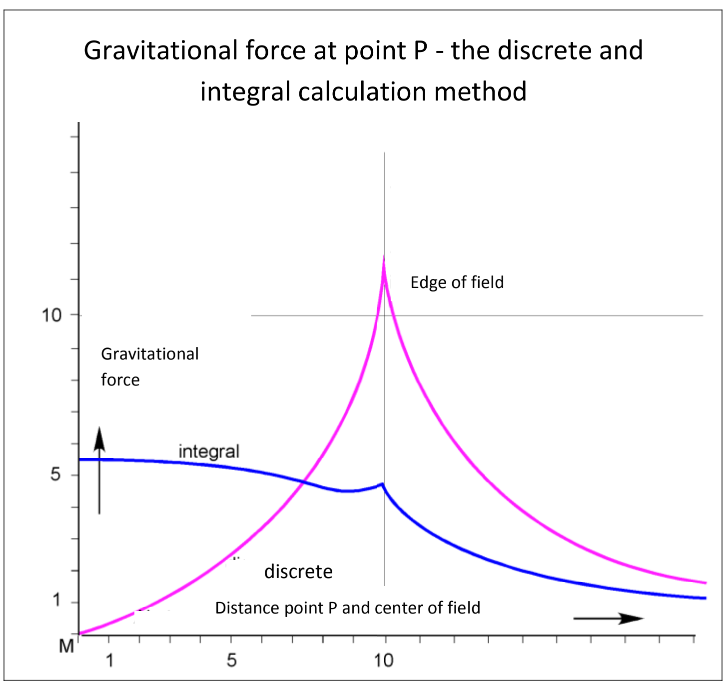


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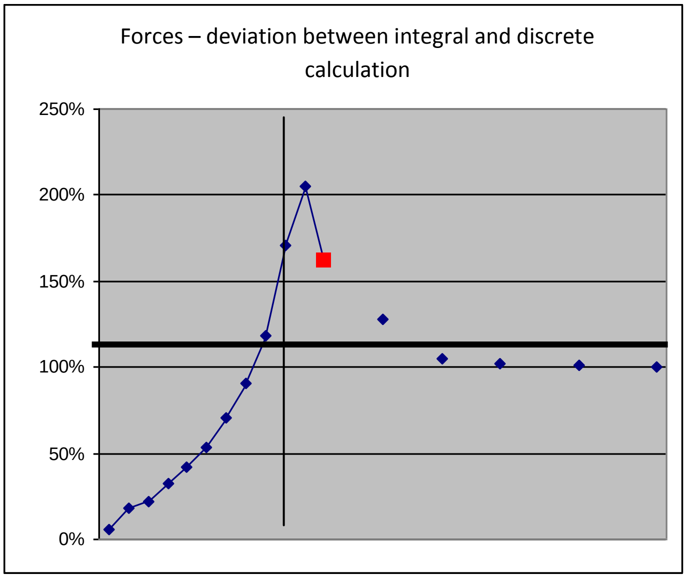
Figure 8 shows the calculated gravitational forces exerted on a point P within and outside of a massive homogenous field. The edge of the plane is visible on the vertical line in the center. The blue curve represents the forces determined with integral calculation. In contrast, the pink line shows the forces calculated with the discrete method. Clearly, the results of both methods are different. Furthermore, the integral and discrete methods differ in all values of force F, mass M, and distance r.

The considerable difference of integral and discrete calculation of gravitational forces in a plane is illustrated in the following *Figure 9*.

Figure 9



The 100% line represents the forces determined with the integral calculation method. All values which go beyond the line at 100% indicate that the gravitational forces determined with the discrete calculation method are stronger close to the edge of the plane than those calculated with the integral method. Close to the center of the field, however, the gravitational forces determined with discrete calculation are smaller than those determined with the integral method. (Values taken from the EXCEL model file KOGUK 10)

The discretely determined gravitational values in a homogenous plane close to the center are considerably smaller than those calculated with the integral method. If the point P is moved toward the edge of the plane, the gravitational forces determined with the discrete method increase faster than those calculated with the integral method. At the edge of the plane, the discretely calculated values are twice as high as the integral values.

The markers in *Figure 9* represent the different distances from the center of the plane - starting on the left side with 1 to 10 (the perpendicular line representing the edge of the surface). The greatest gravitational force is achieved at point 11, because all masses can exert their gravitational forces on point P for the first time (the grid lining prevents this in point 10). The red marker represents a location outside of the plane with a distance of 12 to the center, followed by 15, 30, 45, 60, and 100.

The gravitational forces decrease on the outside of the homogenous plane without reaching the low values determined with the integral calculation method.

The results of the discrete calculation are also compatible with the Virial theorem and its ratio of potential and kinetic energy (Krause, 2005c).

5. *Further application of the discrete gravity calculation (Gravity lenses and problems of Pioneer probes)*

Two examples of the errors that occur with integral calculation are the distance calculation of pioneer probes and the light deviation of galactic lenses.

- ✓ A faulty calculation is a very likely explanation for the unexpected, hesitant movement of the two pioneer probes out of our solar system. If all masses of our solar system (perhaps even the mass of the Oort cloud) are entered in a discrete calculation model, the gravitational factor increases by 0.0064% compared to the integral calculation method. This sufficiently explains the puzzling brake-effect on the pioneer probe. Hence, there is no need to postulate a new energy (NZ Online, 2002)!

- ✓ The tendency of distant galactic gravity lenses to deflect light more intensely than calculated is also easily explained. The gravitational force determined with integral calculation is too low! A discrete calculation of gravitational forces results in a mass equivalent twice as high as previously determined. In addition, the integral calculation method uses point masses that are too small (Wambsganss & Schmidt, 2005).

Two observable – until now- inexplicable phenomenon can be explained with a discrete calculation of values and without the assumption of dark matter.

Debatable dark matter

The dark matter error is more prevalent in the calculation of field or surface than the calculation of spheres, because of the differences in gravitational forces. If the mass of a distant field galaxy is determined over the visual orbital speed of its masses (on libration tracks), the result of such an integral calculation is always too large. On one hand, the base mass is assumed to be too big, and on the other hand, the gravitational orbit is confused with the libration track. This double error leads unavoidably to the incorrect assumption of an invisible dark matter (Krause, 2005a).

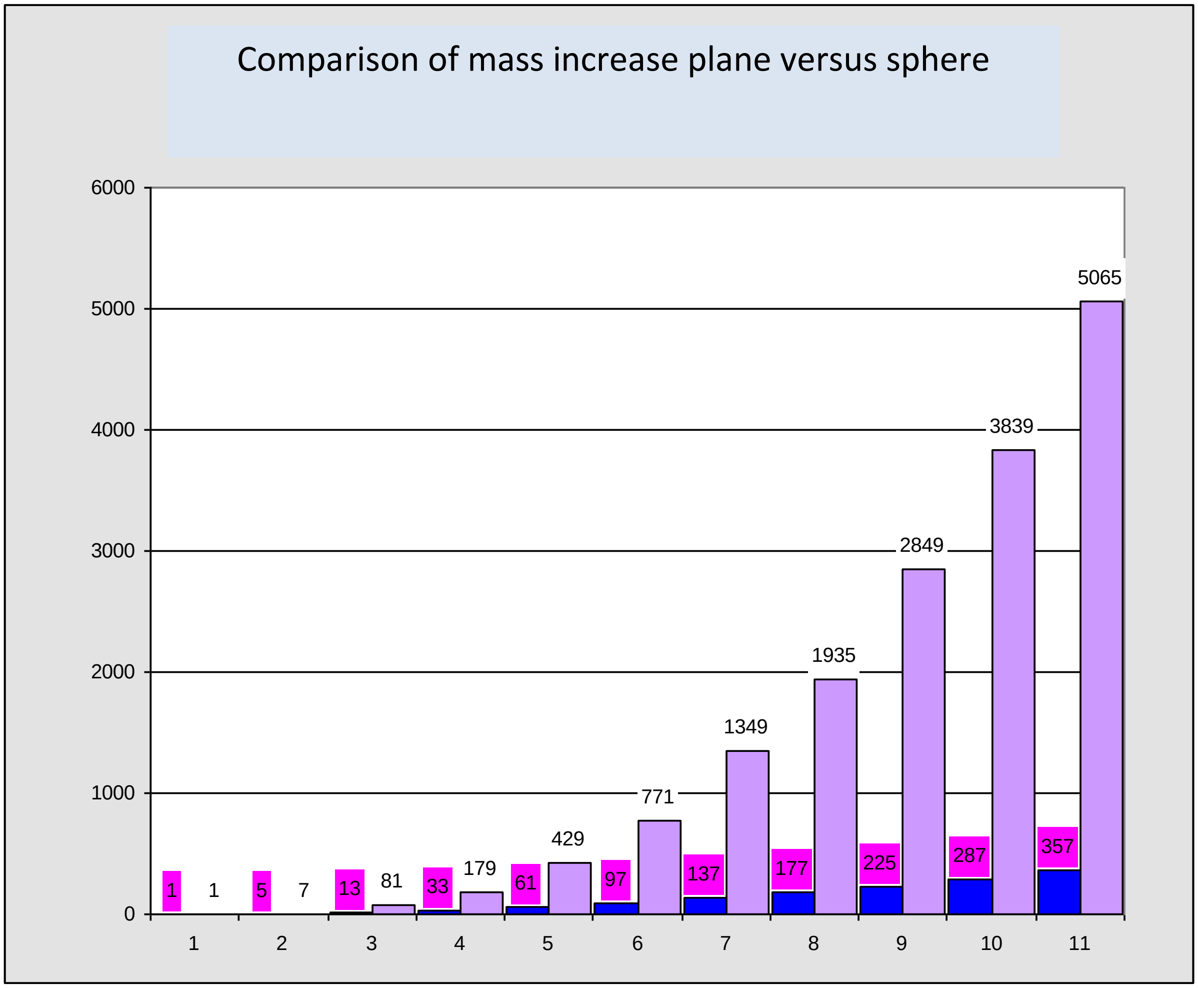
A larger mass is calculated for a sphere galaxy because the increase in mass points per inner sphere increases compared to a field or surface galaxy, which is illustrated in *Figure 10*.

In a plane with homogenous mass distribution, the number of masses per section increases (blue columns with pink numbers). Similarly, the number of masses in sphere sections increases toward the edge (large violet columns). If the mass next to the center is assumed to be 100% of the galaxy mass, the *dark matter* is determined according to the following schema:

- ✓ Increase of dark matter on a plane: 357/5 shares of visible matter = 71.4 shares dark matter
- ✓ Increase of dark matter in a sphere: 5056/7 shares of visible matter = 722.3 shares dark matter

It is easy to see that the calculated dark matter in a sphere is 10 times higher than that of a field. What a fatal miscalculation!

Figure 10



6. *Summary*

The result of the comparison between the two different calculation methods is unambiguous. The integral calculation-method, with its inner masses condensed as single point mass, is not suitable for calculation of gravity in an accumulation of masses, as it leads to the wrong assumption of a dark matter.

The integral mass calculation according to Newton harbors the following mistakes:

- ✓ The integral formula used for the calculation of masses in a sphere is also applied to the plane calculation.
- ✓ The integral method ignores the fact that the orbits of galactic masses are only visual libration tracks.

- ✓ Declaring a fraction of the whole mass as the new combined mass of a galaxy leads to multiple galaxy masses after an integral calculation. (masses close to the center are used as combined mass of the galaxy)
- ✓ Using a wrong mass as basis for integral calculation leads to even greater calculation errors in a sphere galaxy.
- ✓ It is impossible to determine the mass of a visual center by the orbit speed of masses on libration tracks.
- ✓ The visual orbit of a point P close to the center is a libration track, as the surrounding masses lose their gravitational effect on point P in a homogenous plane.

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