Aspects:

My name is Alex Panzer, and I am an Astrologer. I was very fortunate in my early training in that I had outstanding access to a huge library of out of print texts. I later also received advance training from a teacher who was very knowledgeable about Astrology, including of the more esoteric forms such as Horary Astrology. I also have a background in astronomy and computer science, so a major Astrological interest for me is the process of chart erection.

In this paper I will reveal an accurate way to identify Aspects, because plotting accuracy will directly improve your Astrological chart interpretations. Although anyone could follow along (I have purposely avoided using Calculus and advanced mathematics), it is best if you already have experience erecting Astrological charts.

Harmonic Interaction Model for Defining Aspects
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The foundation of Astrology is precise mathematical calculation. Therefore, the various components used by Astrologers, such as Aspects, should be precisely calculable. But are all astrologers using the same calculation methods? Let us take a random survey.

Here are four descriptions of how Aspects are to be calculated, as espoused by four different teachers. I am showing these examples only because they came from reputable Astrologers, and their web page popularity placed them in the first results page of a search engine query:

Internet Definition #1:
"*Aspects are formed by division of the circle of 360 degrees by certain numbers, and may be understood through the laws of numerology. Division of the circle by 3, 6 and 12 is harmonious and flowing, while division by 2, 4 and 8 is rigid, structured and difficult.*"

Internet Definition #2:
"*Planets in a Pure Mathematical Horoscope are said to be in Aspect only when they are a multiple of 30 degrees apart. There are a total of 12 Astrological Aspects but 5 of the Aspects are actually duplicates of previous Aspects. Therefore there are actually only 7 valid Aspects. That's one of the reasons many religious text mention the numbers 7 and 12 so often. These numbers like the trinity, have tremendous spiritual significance and were quite holy to the ancients. Astrologers that don't use the ancient system are deluding themselves.*"

Internet Definition #3:
"*In astrology, an aspect is an angle the planets make to each other in the horoscope, and also to the ascendant, midheaven, descendant, lower midheaven, and other points of astrological interest. Aspects are measured by the angular distance in degrees and minutes of ecliptic longitude between two points, as viewed from Earth. According to astrological tradition, they indicate the timing of transitions and developmental changes in the lives of people and affairs relative to the Earth.*"

Internet Definition #4:
"*The angular relationships between the planets in a horoscope, measured as angles within the ecliptic circle, are termed "aspects". Usually this includes angles to the ascendant and MC. Only certain angular relationships are regarded as aspects, and these are said to have intrinsic qualities - they are said to be "harmonic", "dynamic" or "neutral". These relationships influence how the planets work together. There is also a certain amount of "play", which means that an aspect is said to "work" or be operative within a few degrees either way of being exact. This margin of "play" is defined by the orbs.*"

The first person says aspects are partitions of a circle. The second person says aspects are always multiples of 30 degrees. A third person says an Aspect can be ANY amount of degree separation. And the fourth person says only some Aspects are important, but that there is a "fudge" factor that must always be applied when they are calculated (so much for mathematical precision in Astrology I guess).

None of these four randomly chosen definitions are in agreement, meaning Astrologers are *not* all using the same calculation method to define Aspects. So what method should we be using? And choose we must, because we can't make a valid Astrological interpretation unless the chart we are using has been accurately calculated.

For a long time I noted and struggled with these calculation inconsistencies myself. Why is there so much difference of opinion about something that is so fundamental to Astrology?

Because almost all western astrologers, both natal and horary, agree that the Aspects are a major constituent necessary for proper chart interpretation, I was not convinced that Aspects were simply without merit. So grasping for a reason for the differences of opinion, I considered that the definition of an Aspect may have evolved over time, and that some teachers were just using outdated methods. Having done Astrological charts by hand, I understood the difficulty, and understood why Astrologers may have chosen to use simplified methods of calculation, or may have drawn incorrect conclusions, in the days before calculating machines.

Thus I first began searching for the answer by studying of the history of Aspects, to see if there I could uncover the correct calculation method that should be used for my charts.

When you go back earlier than two millenia, history gets murky, so lets begin with Rome. Classical Roman astrologers usually linked the Aspects to an equal 12-part division of the Zodiac. Any planet falling anywhere within the 30 degree boundaries of a Zodiacal Sign, was in Aspect to every planet anywhere within the boundaries of another Zodiacal Sign according to this table:

    Within the same Sign (i.e., 0 degree separation) = Conjunct
    One Sign away to the left or right (i.e., 30 degree separation) = Semi-Sextile
    Two Signs away to the left or right (i.e., 60 degree separation) = Sextile
    Three Signs away to the left or right (i.e., 90 degree separation) = Square
    Four Signs away to the left or right (i.e., 120 degree separation) = Trine
    Five Signs away to the left or right (i.e., 150 degree separation) = Inconjunct
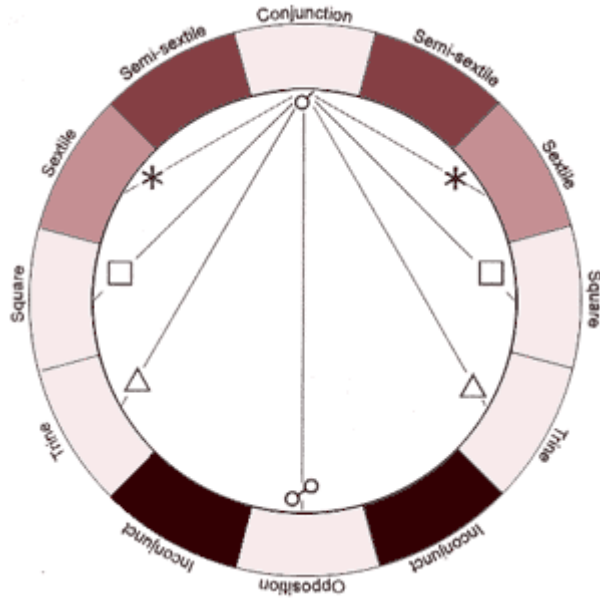   Six Signs away (i.e., 180 degree separation) = Opposition

Illustration of the Sign (Platick) method of indicating Aspects

These astrologers clearly knew that, although this method was expedient, it had its limitations. The Semi-Sextile was considered of too weak an influence to be of much importance, and therefore often discarded. The Inconjunct (literally "unconnected") was also looked upon with aversion because it could not be illustrated by inscribing a polygon within a Zodiac wheel.

Why the aversion to the Inconjunct? Well, it was because at this time in mathematical history, geometry dominated. It was very popular to define most everything, including the relationships of the planets and Zodiacal signs, in terms of relationships to inscribed polygons and Platonic solids. Kepler's famous 3d model of the celestial spheres is a recent example of describing the solar system using this classical geometrical relationship.
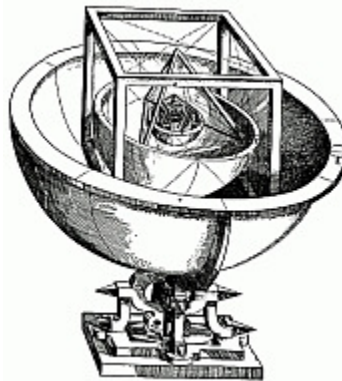
Kepler's Platonic Solid model of the celestial spheres

While the Sign method is easy to calculate (an important factor in the days before mechanical calculators), and therefore was usually used for everyday affairs, it should be reiterated that these astrologers were also keenly aware that a more precise calculation of planetary Aspects, based on degrees of arc of the Zodiacal circle, could be calculated that produced better results. For example, an Aspect assumed to be a Trine by the Sign calculation method, could be shown to actually be a Square using the more precise degree calculation method.
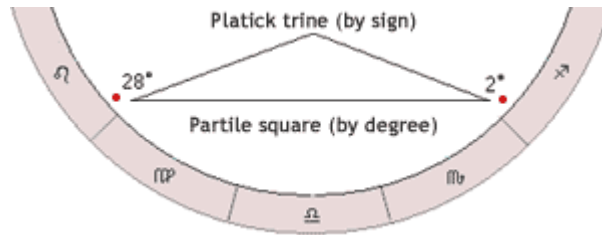
Illustration of how differing calculation methods can produce different Aspects

These Astrologers also noted that Aspects between planets appeared to have a weaker force of strength in their interpretation the farther away they are from an exact 0, 30, 60, 90, 120, 150, or 180 degree separation (an exact degree of separation, where the force is strongest, is called "Perfection"). This factor could not be indicated when using the simpler Sign method of calculation.
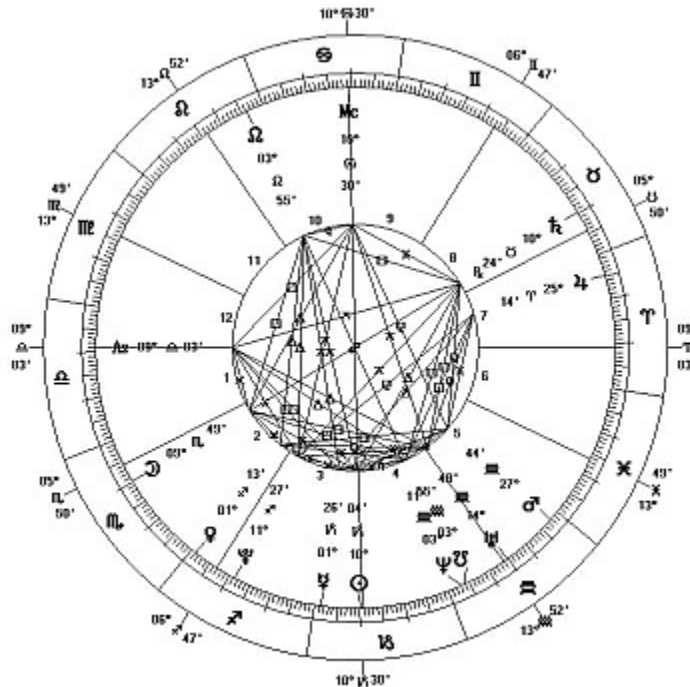
Example of a Degree (Partile) wheel chart, exhibiting various Aspects

Astrologers therefore based the interpretation importance of an Aspect on whether it was calculated as Platick (literally "plate" or "broad area"), in reference to the Sign method, or Partile (literally "part" or "degree") in reference to the more precise Degree method. As mathematicians became more proficient at their craft, the Platick method began to be replaced more and more by the Partile method of Aspect calculation, until by the middle ages, only the Partile method was being used.

Thanks to advances in observational astronomy, astronomers were able to perfect their ephemeri. This now allowed Astrologers to turn their focus on the ancient observation that although Perfection is the definition of Aspect, points close, but not exactly in Perfection, also exhibit the qualities of being in Perfection, but in a weaker form.

Thus the next important phase in Aspect calculation, the Orb, came into usage. An Orb (literally "circle" or "sphere") is defined as the number of degrees before or after Perfection (essentially, the radius from the center point) that still exhibits qualities of the Aspect strong enough to be influential. Note though that although an Astrological interpretation can vary depending on whether an Aspect is Applying or Separating (Horary Astrologers for example generally interpret Applying as relating to future events, while Separating relates to past events), when looking only from the perspective of static influential strength, it is just the degree of separation that appears to make a difference, not orbital motion.

But now Astrologers came face to face with a new problem... how wide should an Orb be?

That was a question that had almost as many answers as there were Astrologers. Thanks to telescopes showing that celestial object sizes differed, some Astrologers proposed that the Orb should be based on the occulting diameter of the astronomical bodies involved.   For example, 8 degrees for the Sun, 6 degrees for the Moon, etceteras. Others felt that these Orbs should be modified based on the planets Astrological influence. For example, Jupiter would be given a greater Orb of influence than its occulting diameter would suggest. Still a third group decided that all Orbs should be just 5 degrees from Perfection, period.

By the start of the Renaissance most Astrologers held the notion that the Orbs, rather than all having the same fixed radius from Perfection, should be determined on a case basis by combining the radius sizes individually assigned to the Aspecting Planets involved. Most astrologers were comfortable assigning the following radius of influence to the planets:

> Sun = approximately 7.5 degrees
> Moon = approximately 6 degrees
> Jupiter = approximately 4.5 degrees
> Saturn = approximately 4.5 degrees
> Mars = approximately 4 degrees
> Venus = approximately 3.5 degrees
> Mercury = approximately 3.5 degrees

Astrologers also assigned Orb radii to fixed stars. Preserved records are a bit unclear as to how many degrees were being assigned, but many scholars believe it was probably only about 1 degree, with the more important stars having a slightly larger radius. No Orb radii were apparently assigned to any other celestial bodies.

An astrologer would then add the radius associated with the two planets being Aspected, to determine the Orb for the Aspect. Most astrologers accepted the Orbs for each planetary combination to be as follows:

Sun to Moon = 13.5 - 14.75 degrees
Sun to Jupiter = 12 - 14.5 degrees
Sun to Saturn = 12 - 13.5 degrees
Sun to Mars = 11 - 12.5 degrees
Sun to Venus = 11 - 12.5 degrees
Moon to Jupiter = 10.5 - 12.25 degrees
Sun to Mercury = 11 - 12 degrees
Moon to Saturn = 10.5 - 11.25 degrees
Jupiter - Saturn = 9 - 11 degrees
Moon to Mars = 9.5 - 10.25 degrees
Moon to Venus = 9.5 - 10.25 degrees
Jupiter - Mars = 8 - 10 degrees
Jupiter - Venus = 8 - 10 degrees
Moon to Mercury = 9.5 - 9.75 degrees
Jupiter - Mercury = 8 - 9.5 degrees
Saturn - Mars = 8 - 9 degrees
Saturn - Venus = 8 - 9 degrees
Saturn - Mercury = 8 - 8.5 degrees
Mars - Venus = 7 - 8 degrees
Mars - Mercury = 7 - 7.5 degrees
Venus - Mercury = 7 - 7.5 degrees

As stated earlier, an Aspect made at the extreme limits of an Orb, was thought to be much weaker than one made closer to Perfection. A way to imagine this is to think of a radio volume control on a radio tuned to a broadcast. At the volume controls lowest setting, you might catch a glimmer of sound, but not be able to tell what it was. As the volume gets turned up, you would eventually reach a point where you could begin to understand the content, and you could tell for example whether it was an announcers voice or a music selection. In our astrological comparison, this would be the equivalent of the extreme edge of an Aspect Orb.

As the volume continues to be raised, you will eventually reach a point where the volume was loud enough that you could clearly understand the broadcasted shows content. From this point forward, the volume could continue to be increased, all the way to full, but it would not make intelligibility any better, just louder. In our astrological comparison, this point between the extreme edge of the Orb, and the point where the effect of the Aspect is strong enough to be clearly influential, was named "Completion".

The name "Orb" originally encompassed the entire distance between the extreme edge of the Orb and the Aspects Perfection point. The lesser distance from just the Completion point to the Aspects Perfection point was given the name "Moiety" (literally "half"), because most Astrologers considered Completion to be reached at approximately 1/2 the full Orb size.
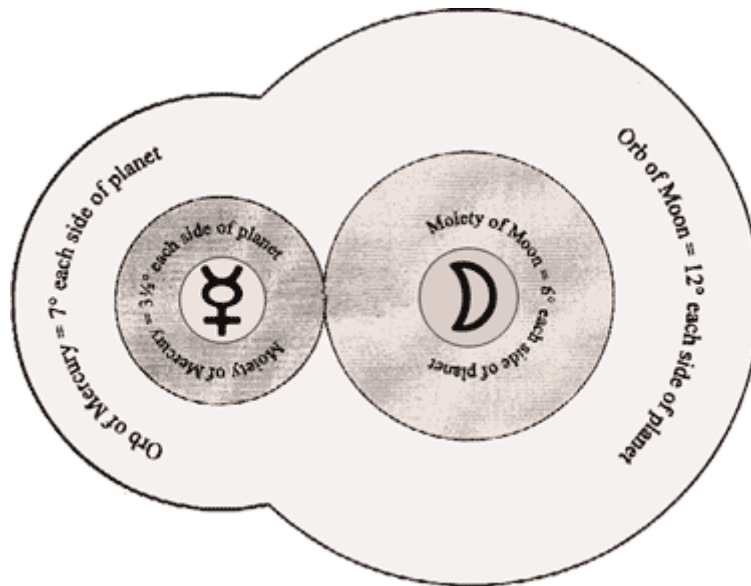
Illustration of the Orb and Moiety of two closely Conjunct planets

Now that the Partile method reigned supreme, some Astrologers began to consider that there might be justification for additional Aspects. Of particular interest were the Aspect expansions proposed by the scientist Johannes Kepler. Advanced Astrologers soon began using these Aspects in their charts, although again for simplicity in the pre-calculator era, many Astrologers would stick with as few as five.

This was the way planetary Aspects were calculated until as late as the 1930's. Although other planetary bodies, such as Uranus and Neptune, had joined the pantheon, these bodies were able to be incorporated without too much trouble. But with the discovery of Pluto, and with other discoveries rapidly flowing from the new astronomical observatories, Astrology fell from favor, and many Astrologers retired. What remained of the fragmented Astrological community decided that it had to modernize to remain relevant in the 20th century, and so much about Astrology was overhauled, including Aspect calculation.

Under the banner of modernity, Astrologers felt they should simplify by reducing the size of the Orb to the Completion point, essentially making the term Orb mean the same as Moiety. The term Moiety was thereafter abandoned. Strangely though, they later added the caveat that if other chart indicators suggested that there might be some justification during interpretation to include a weak influence, it would be acceptable to arbitrarily stretch the newly accepted maximum Orb size slightly to force an Aspect to be valid. In practice, this was just stretching these newly defined "Orbs" back to the size that they were before their sizes were modernized!

More fundamentally however, these modernists decided that determining an Aspects Orb based on the planets involved was too complex. Instead, Aspects would now be based on the type of Aspect formed, rather than considering what celestial body was involved. This change to the way Aspects are calculated probably occurred because it easily allows the incorporation of any celestial body, including for example asteroids, into a chart, without the need to first establish an Aspect influence radius for each of these new bodies.

As more Astrologers gained access to calculating machines, many began experimenting to see if any Aspects other than the traditional Aspects had influence. This caused the number of accepted Aspects to slightly grow, but at the same time showed that some Aspects did not have as noticeable an influence as others. The terms "Major" and "Minor" were then applied to differentiate influential strengths of the Aspects. Along with the categorizing of Aspects into Major and Minor, the Orb sizes were once again redefined, so that their size closely reflected the Aspects interpretation influence (the larger the Orb, the more supposedly powerful the Aspect).

Although some Astrologers insist there are other valid Aspects, most modern Astrologers are comfortable limiting themselves to the following 13 Aspects and their "Orbs" (i.e. old Moiety):

    (0°) Conjunct = 7 - 9 degrees
    (180°) Opposition = 6 - 8 degrees
    (120°) Trine = 6 - 7 degrees
    (90°) Square = 5 - 6 degrees
    (60°) Sextile = 2.5 - 3.5 degrees
    (72°) Quintile = 2 - 3 degrees
    (144°) Biquintile = 2 - 3 degrees
    (45°) Semisquare = 1.5 - 2.5 degrees
    (135°) Sesquiquadrate = 1.5 - 2.5 degrees
    (36°) Decile = 1 - 2 degrees
    (108°) Sesquiquintile = 1 - 2 degrees
    (30°) Semisextile = 1 - 1.5 degrees
    (150°) Inconjunt (a.k.a. Quincunx) = 1 - 1.5 degrees

Astrology, having fallen by the wayside, suddenly surged in popularity during the 1970's, due to a combination of a New Age awakening and the availability of computers which could simplify chart erection. However at this time, most of the classical Astrological texts were out of print, and there were not enough active Astrologers available to teach classes. To fill this gap, a flood of 'pop' Astrology texts flooded the market. Unfortunately these texts mostly avoided many of the traditional Astrological techniques and terminology, including even mathematics, in order to simplify Astrology for the masses, and they blatantly copied from one another without verifying the accuracy of their sources.

So my hypothesis was right. The definition of an Aspect had evolved over time, and some teachers are indeed using outdated, or simply wrong, methods without knowing any better.

It is true that without knowing the interperetational meaning of Aspects, or even the reasons for why Aspects occur, a person can still identify and plot Aspects on an Astrological chart. Authority figures could also just pronounce by fiat that Aspects are just so many degrees separation, and leave it at that. I tend to be somewhat skeptical when presented with dogma, and need to see the evidence, or understand the reasons, before I am willing to embrace it. So, as Astrological chart erection relies heavily on mathematics for other components, I strongly felt that I should at least pursue uncovering a mathematical formula for the Aspects as well.

First order of business then was to either support or debunk the divisioning claim. Aspects can be described as an angle of arc (a Square for example is 90 degrees), but does this angle occur because it is a mathematical byproduct of inscribing or partitioning a circle (as is claimed by the Internet Definition #1 at the beginning of this paper), or it is just a coincidence?

With the early Astrologers being influenced by the prevailing religious beliefs that a god would design the universe perfectly, and enamoured with the mathematical beauty of regular polygons, it is not surprising that the Trine (which when inscribed in a circle forms a triangle), the Square (which when inscribed in a circle forms a square), and the Sextile Aspect (which when inscribed in a circle forms a hexagon) gained early acceptance.

However, the Conjuct, Opposition, and Inconjunt are not formed by the corners of a regular polygon, even though they have also been considered important valid Aspects since antiquity (although please note that there is a devout school of thought that insists the Conjunct is not really an Aspect, and that it should be classed as something else instead).

Many Aspects are also related to even partitions of a circle, in that they match the same degrees of arc as when we evenly divide a circle by a positive integer. Some matches are:

      1 = Conjunct (360°)
      2 = Opposition (180°)
      3 = Trine (120°)
      4 = Square (90°)
      5 = Quintile (72°)
      6 = Sextile (60°)
      8 = Semisquare (45°)
    10 = Decile (36°)
    12 = Semisextile (30°)

But again we find that this partitioning does not account for the traditional Inconjunct, or for the more recently accepted Aspects of Biquintile, Sesquiquadrate, or Sesquiquintile.

The conclusion then was that NO, Aspects are not the result of inscribing or partitioning a circle. But was there any other way to evenly divide a circle that still might work?

It has been observed that some Aspects exhibit similar interpretational qualities. When we group the modern list of 13 commonly accepted Aspects into sets that have harmonious interpretational qualities, we notice that they can be grouped together accordingly:

      Conjunct
      Opposition & Square & Semisquare & Sesquiquadrate
      Trine & Sextile & Semisextile & Inconjunct
      Quintile & Biquintile & Decile & Sesquiquintile

Similar to our earlier attempt to divide a circle by a positive integer, we note that these groupings are fractionally related to the integers one, two, three, and five.

    1/1 = Conjunct
    1/2 = Opposition, 1/4 = Square, 1/8 = Semisquare, and 3/8 = Sesquiquadrate
    1/3 = Trine, 1/6 = Sextile, 1/12 = Semisextile, and 5/12 = Inconjunct (a.k.a. Quincunx)
    1/5 = Quintile, 2/5 = Biquintile, 1/10 = Decile, and 3/10 = Sesquiquintile

Is dividing the chart by a positive integer, as was tested earlier, but then also considering the fractional relationship to that integer, the formula I was seeking? It is indeed interesting to note that many modern Astrologers now call the Inconjunt a Quincunx. Quincunx literally means 5/12ths. It should also be noted that some Astrologers believe the Aspects are numerologically related (see Internet Definition #1 again).

But wait! Although not harmonious, some of the Aspects are still fractionally related. For example: The fractions 1/12 = Semisextile and 2/12 (*1/6*) = Sextile, are both harmonious, but 3/12 (*1/4*) = Square, is not! 4/12 (*1/3*) = Trine and 5/12 = Quincunx, are again harmonious, but 6/12 (*1/2*) = Opposition, again is not! Note: We ignore the higher fractions such as 7/12, 8/12, etceteras, because they exceed the 180 degree barrier for defining an Aspect (instead of 7/12 the Quincunx should be substituted, instead of 8/12 the Trine should be substituted, etceteras).

Well then, perhaps fractional divisioning will reflect Aspect interpretational strength (based upon modern Orb size), when we rank the Aspects by fractional value? Fractional value 1/1 would top the list, fractional value 1/2 ranks next, 1/3 after that, etceteras (i.e., Conjunct, Opposition, Trine, Quintile/Biquintile, Square, Sextile, Semisquare/Sesquiquadrate, Decile/Sesquiquintile).

Conjunct has the strongest interpretational influence, Opposition second strongest, and Trine third strongest, which exactly matches the fractional divisioning rankings. Quintile ranks fourth in the fractional divisioning ranking, but according to interpretational influence, Quintile should fall in sixth place, after the fourth place Square and the fifth place Sextile. You could I guess suggest that the Square Aspect really should be placed fourth, because it can be related to positive integer 4. But the Sextile will still be fractionally ranked after the Quintile, even though according to its modern Orb size interpretational strength, it should be placed before.

The conclusion then is that NO, Aspects are not numerologically correlated with a fractional divisioning of a circle either. So why then, with the ease in which we were able to discount these various circle dividing methods, have these methods held such sway in the recent Astrological literature?

I believe that the reason for this is the recent close correlation of Astrology and wheel charts in the popular mind, even though wheel charts are nothing more than visualization tools (like the useful models of an earth centered universe or an aether medium). In fact, until recent times, the most popular way to display an Astrological chart was actually as a square, with the Aspects listed separately on a table. It has only been with the recent desire to include the Aspects within the same chart, that the wheel has gained prominence. Nowadays because most Astrologers rely on computers to erect their charts, focusing their learning instead on chart interpretation, they don't really understand chart erection mechanics. Therefore when they see what looks like inscribed lines and polygons, they make the erroneous assumption that Aspects are actually formed by drawing partitions on a chart wheel.

Example of an astrological chart in the shape of a square

So what other mathematical method might still be able to determine Aspects? Perhaps the case of inexact Aspects might lead to the answer?

Analysis of numerous horoscopes has led to an agreement amongst most modern Astrologers that an Aspect is not just a point defined by an exact degree, minute, and second of arc, but rather a blob of minutes, or even degrees, of arc. The ongoing Aspect debate has been not about the validity of the Aspects themselves, but rather about exactly how large this blob should be, and if, or how much, the interpretational influence fades as one gets closer to the blobs demarcation edge. This is similar to the radio volume control analogy I used earlier; and maybe this concept of amplitude change will be the clue that solves the Aspect problem?

Now my background is in electronics, and I often have to visualize amplitude in the transmission patterns of antennas and the reception pattern of microphones. The chart I use is called a polar chart. Like the common Astrological wheel chart, it is based on a 360 degree circle, but it also includes evenly spaced rings radiating from the center. You could plot an Aspect on a polar chart just like you can on a wheel chart, but the radiating rings will also allow you to mark an Aspects changing interpretational intensity. For example, the outermost ring could symbolize the Aspects maximum strength, while the innermost ring could symbolize the Aspects minimum strength. As you draw an Aspect line from the first plotted object towards the second, the line, rather than being straight as with the wheel chart, it would dip down from the outer ring towards the inner ring, and then rise again back up to the outer ring by the time it reaches the second plotted object. If you assumed the intensity change was consistent in the areas outside the Aspects orb, and you plotted, for example, a Grand Square upon a polar chart, it would visually appear much like a four-blade fan, rather than like the square shape seen on a typical wheel chart.
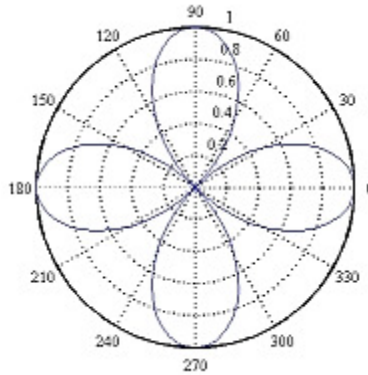
Example of a Grand Square plotted in a polar manner

What we have drawn on this polar chart is exactly the same pattern as would occur if we had plotted a wave. Could Aspects then possibly be a manifestation of harmonic interactions?

I will begin my exploration by creating a hypothesis that there is a medium in which a sine wave is being generated. For the mathematics of this hypothesis, the actual frequency of the fundamental wavelength is unimportant, so I will just refer to it as "the funamental wavelength".

Note that in math and science, phrases are often substituted with a symbol, usually a Greek letter, so you don't have to keep writing the words over and over again. The Greek letter "Ω" (omega) for example, is used in electronics as a shortcut for the words "ohms of resistance". Scientists use the Greek letter "λ" (lambda) to refer to the phrase the "fundamental wavelength", and for convenience I will use this shortcut symbol hereafter also.

Amplitude is also unimportant for this hypothesis, so for ease in computation, I will assign the maximum amplitude to be 1. We can calculate and then plot all the points of a single period of the λ ("fundamental wavelength") on a polar chart, and I will do so by starting the plot at zero degrees and maximum amplitude, then ending the λ plot back at zero degrees, after having gone around the chart through 360 degrees.

To properly plot the λ, I would have had to calculate amplitude for an infinite amount of points. For practial reasons, I limited myself to only calculating the amplitude for every 1/8th of a degree, as this produces a plot of sufficient granularity to initially test my hypothesis.

The resulting plot appears identical to the plot of a fading (i.e. Orbed) Conjunt Aspect.

Earlier I noted that some Aspects exhibit similar interpretational qualities. I further noted that these groupings were fractionally related to the integers two, three, etc.. Waves can also be of different frequencies that are integer multiples of the fundamental wavelength. We determine these frequencies by simply multiplying the λ by the whole numbers 2, or 3, or etc.. These related frequencies, which are periodic to the λ, are called harmonics.

If I overlay onto the plot of the λ the plot for harmonic 2λ (i.e., two times the fundamental wavelength), I get a plot that is identical to a fading Opposition Aspect. For harmonic 3λ, I get a plot identical to a fading Trine Aspect. In fact, using the branch of mathematics know as harmonic analysis, you can match a harmonic to every one of the 12 commonly accepted Aspects (the Conjunt we will disregard henceforth, as it is only an expression of the λ).

But although harmonics could indeed be what Aspects are, it might still only be coincidence. What I need to discover is why only some Aspects/harmonics exhibit noticeable interpretational influence, while others do not. So lets begin by listing Aspect strength as it relates to harmonics. The strongest (interpretationally speaking) Aspect I will label as "A", and continue down the alphabet to the weakest. If two Aspects have the exact same interpretational strength, they will be assigned the same alphabetic letter.

Harmonic 2:
    A = Opposition
Harmonic 3:
    B = Trine
Harmonic 4:
    C = Square
Harmonic 5:
    E = Quintile and E = Biquintile
Harmonic 6:
    D = Sextile
....
Harmonic 8:
    F = Semisquare, and F = Sesquiquadrate
....
Harmonic 10:
    G = Decile, and G = Sesquiquintile
....
Harmonic 12:
    H = Semisextile, and H = Quincunx (a.k.a. Inconjunct)

Several things immediately stand out. First, not every successive harmonic has an associated Aspect. In fact, only harmonics related to the prime numbers, the first of which are 2, 3, and 5, have associated Aspects (harmonic 2 actually includes the harmonics 4 and 8, harmonic 3 actually includes the harmonics 6 and 12, and harmonic 5 actually includes the harmonic 10). Interestingly, the prime numbers, particularly the odd prime numbers, are also the same harmonics of significance to electricians.

Second, the interpretational influence of the Aspects grow weaker as the harmonic frequency gets higher, while Aspects have the same strength if they are of the same harmonic frequency. At first glance this claim seems untrue, as the Sextile is stronger than the Quintile. But the strength decrease could be explained if you also assume that the medium in which the sign wave is standing, is increasingly dampening the amplitude displacement of successively higher order harmonics (a normal wave phenomena that is often exploited in the electronics field). This supposed Sextile inconsistency is erased when we calculate in the amount of dampening.

Here is how it works. The Quintile is the primary period of harmonic 5, and the Trine is the primary period of harmonic 3. Because they are both primary periods, they can be directly compared to determine if dampening is occuring. An examination of Aspect Orb size seems to indicate that the strength of the Quintile is being damped to a level aproximately one third that of the Trine. The Sextile on the other hand, is a second order period of harmonic 3. Second order periods will always have double the frequency of a primary order period, so the Sextile will exhibit aproximatley one half the strength of the Trine (there are always other factors involved, which is why we say aproximatlely). Since one half strength is greater than one third, the Sextile strength will fall above the Quintile strength, when both are compared to a Trine.

The wave theory is looking better and better, so lets turn to another phenomena of sinusoidal waves, the phenomena of phase interaction. Two waves that are in phase will increase total amplitude (the phenomena that produces "rogue waves" in the ocean), while two waves that are out of phase will cause a decrease in total amplitude. Let us begin with the second order harmonic of the fundamental wavelength, and fractionally divide it up. The formulas are 2x2λ ("two times the second harmonic of the fundamental wavelength"), 4x2λ, 8x2λ, 16x2λ, 32x2λ, 64x2λ, 128x2λ, etc.. I am limiting myself to only calculating out to sixty four times the second harmonic of the fundamental wavelength, because it is easier to compute, and because it will produce a sufficient amount of phase interaction to initially test my hypothesis. For practical reasons, I will again assign the maximum amplitude to be 1, and I will limit myself to only calculating the amplitude for every 1/8th of a degree.

Plotted on a linear chart; 2x2λ would at a point 0 degrees on a circle have an amplitude of positive 1, at a point 45 degrees along the circle it would have an amplitude of 0, at a point 90 degrees along the circle it would have an amplitude of negative 1, at a point 135 degrees along the circle it would again have an amplitude of 0, and at 180 degrees along the circle it would be back to an amplitude of positive 1. We will not continue past 180 degrees however, as our definition of an Aspect stops at 180 degrees. This is because, as mentioned, we are allowed to plot an Aspect either forwards in the direction of diurnal movement (called "dexter" or "right" by traditional astrologers) or backwards against the direction of diurnal movement (called "sinister" or "left" by traditional astrologers), and is why any Angle beyond 180 degrees is superfluous.
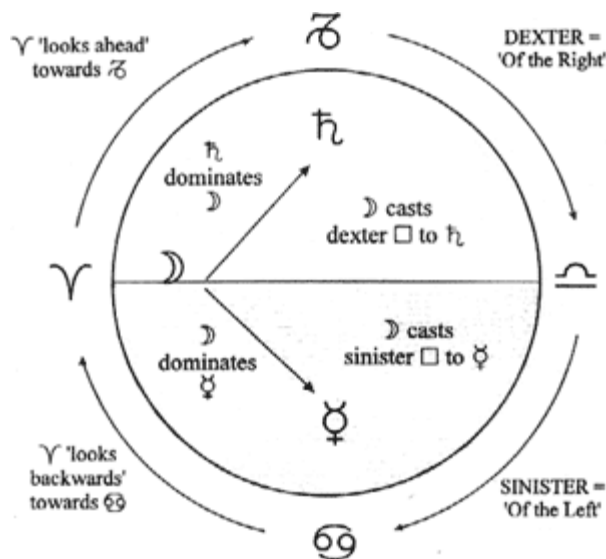

Illustration of Sinister and Dexter directions

We do the same for 4x2λ. Plotted on a linear chart, 4x2λ (which completes its wave cycle in half the space as 2x2λ) would at a point 0 degrees on a circle have an amplitude of positive 1, at a point 22.5 degrees along the circle it would would have an amplitude of 0, at a point 45 degrees along the circle it would have an amplitude of negative 1, at a point 67.5 degrees along the circle it would again have an amplitude of 0, and at 90 degrees along the circle it would be back to an amplitude of positive 1. This pattern then repeats until we get to 180 degrees.

Next we go to 8x2λ, 16x2λ, 32x2λ, and 64x2λ, and plot the amplitude for these to 180 degrees as well. If we were to additively overlay all seven of these second order harmonics on a linear chart (2λ, 2x2λ, 4x2λ, 8x2λ, 16x2λ, 32x2λ, and 64x2λ), we can make the following graph:
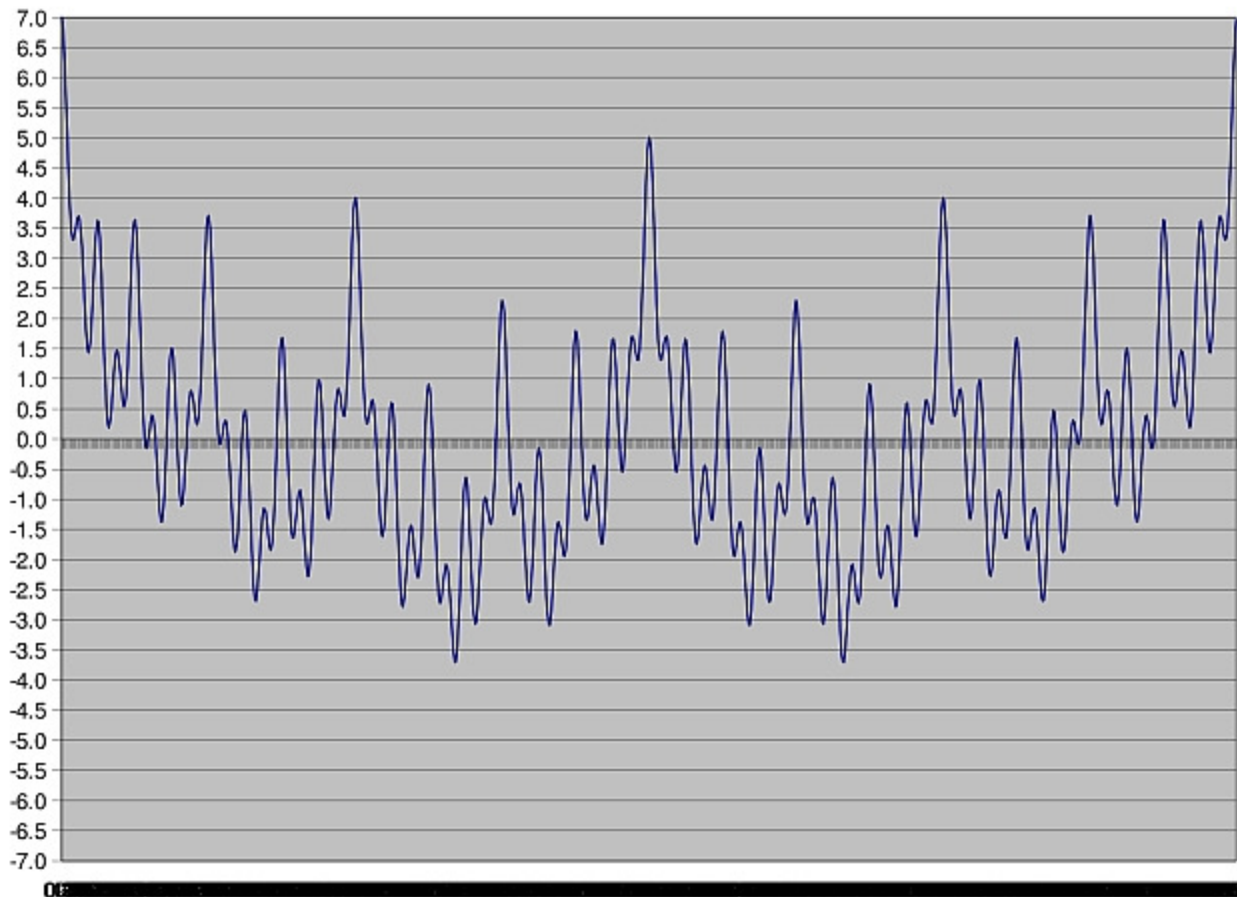

Second Order Harmonic (x=degrees y=amplitude)

The scale on the left of the chart is the amplitude, while the difficult to read scale on the bottom of the chart is the degrees from 0 to 180. What I can see in this chart are some very sharp peaks an dips at certain degrees. The chart is a bit difficult to read though, so lets take some steps to make it easier to see patterns. Please note that I will not be changing any of the data, just displaying it in a clearer fashion.

Assuming for the moment that phase makes no difference (and it probably does not), lets just plot amplitude. Superimposing all the negative driving amplitudes on top of the positive driving amplitudes would produce the following result:
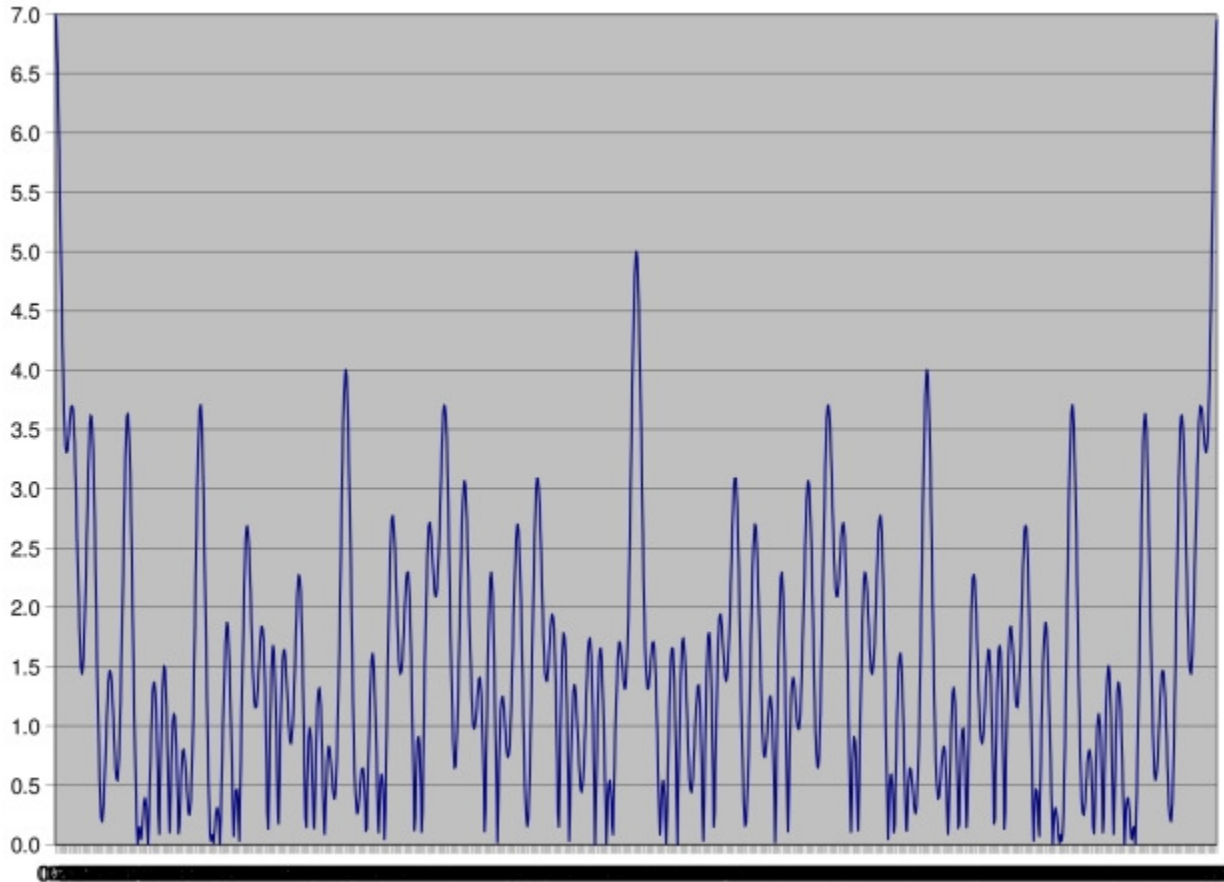
Second Order Harmonic as positive amplitudes

What we can begin to see in this new display is that there are a series of regularly spaced strong peaks or "sensitive points" rising out of a noisy background.   As these peaks are quite strong in relation to the background, we should be able to see the peaks clearer if we zoom in and show only the higher amplitude signals. For testing purposes, lets display only the amplitudes that exceed the fifty percent point on the charts amplitude scale (3.5 and over). When we do, we get the following result:
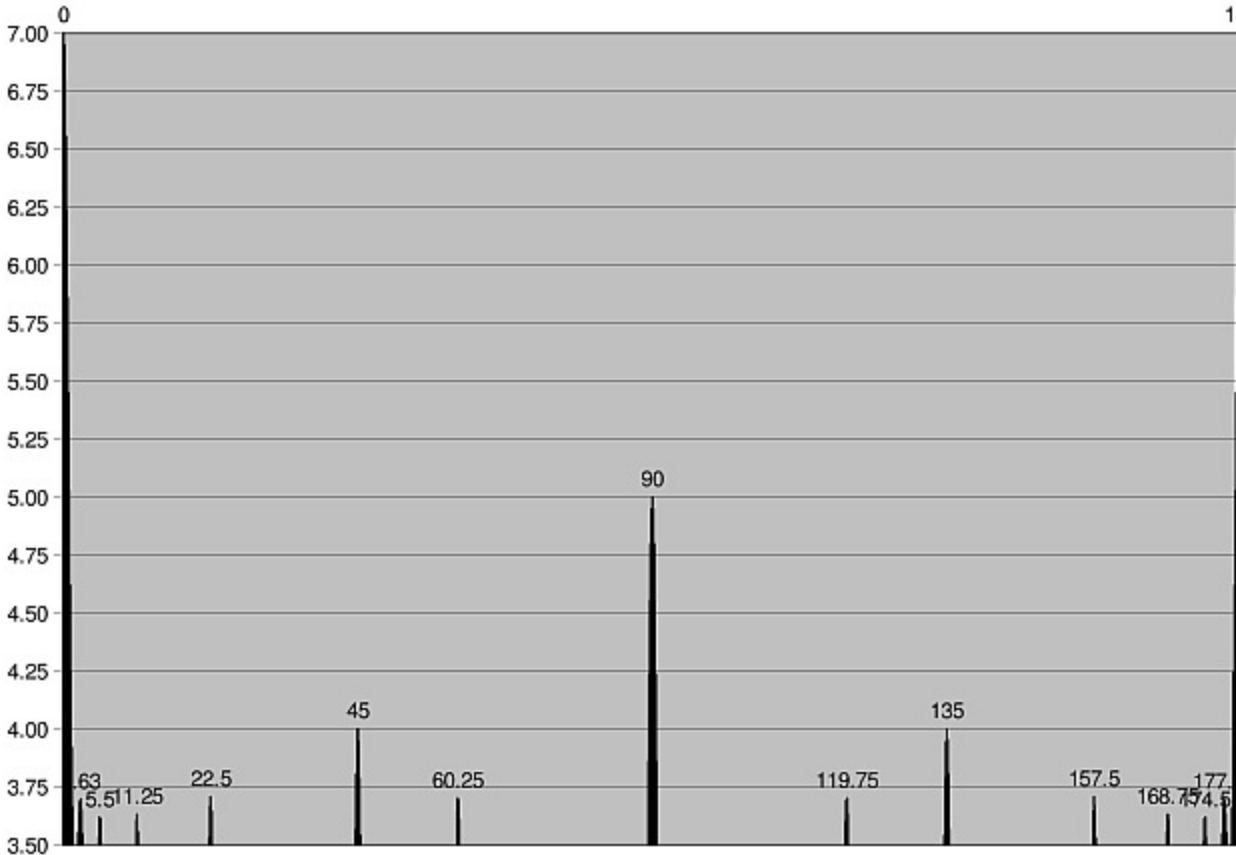
Second Order Harmonic Sensitive Points

Keep in mind that none of the data has changed between these three charts, only the way in which the data is displayed. What we see is extremely interesting. Compare these sensitive points to those of the 180 degree Opposition, 90 degree Square, 45 degree Semisquare, and 135 degree Sesquiquadrate, and you will see that the degree of the sensitive points maximum amplitude matches the Perfection degree of these Aspects exactly! Many of the remaining sensitive points also correlate with other Aspects sometimes used by modern Astrologers.

Furthermore, the amplitude strength of these sensitive points varies in a manner suggestive of the interpretational strength commonly assigned to Aspects perfecting at these same degrees!

Finally, the sensitive points show an analog fall-off in amplitude the farther from exact, just like the Aspects. But even more interesting, the shoulders of these fall-offs are wider for the higher peak amplitude sensitive points, just as occurs with the orbs of stronger Aspects!
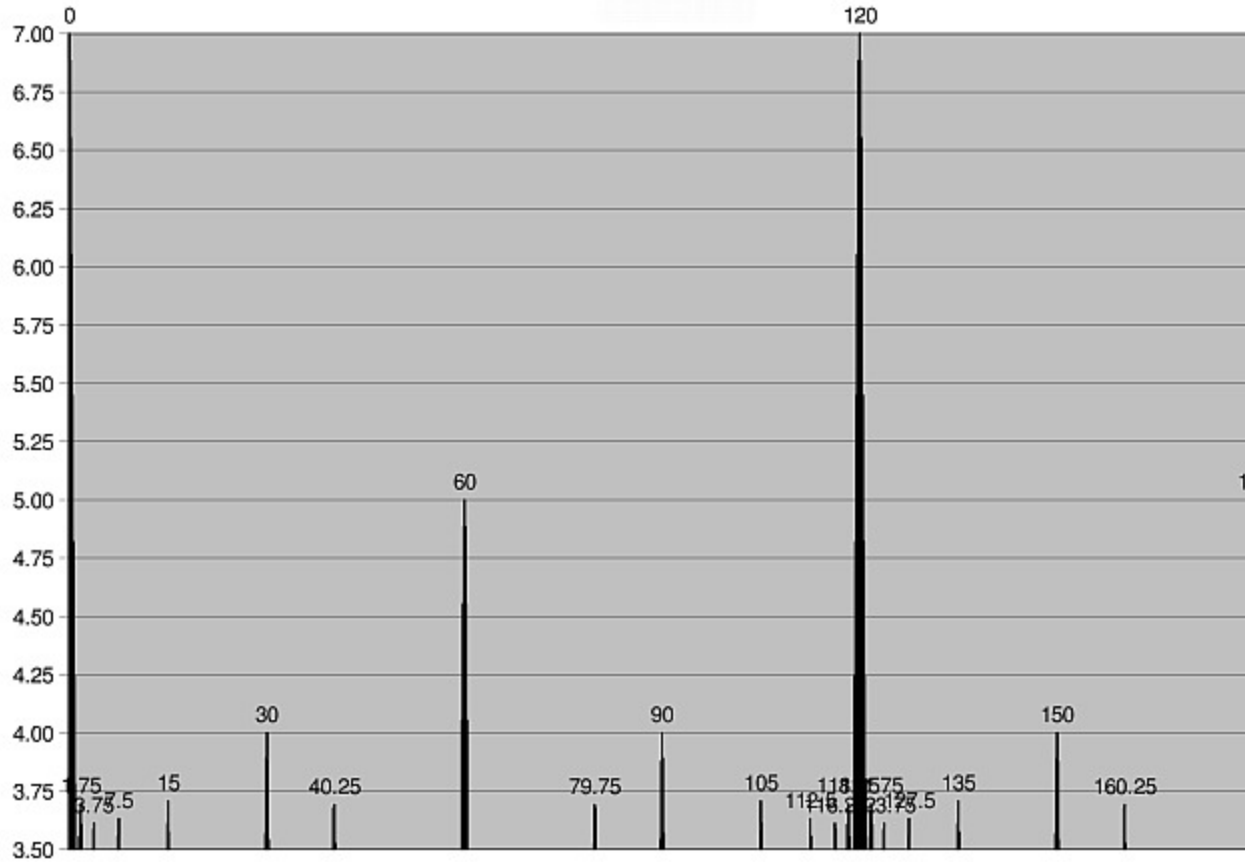
Let us look now at the third order harmonic and see if a similar pattern develops:
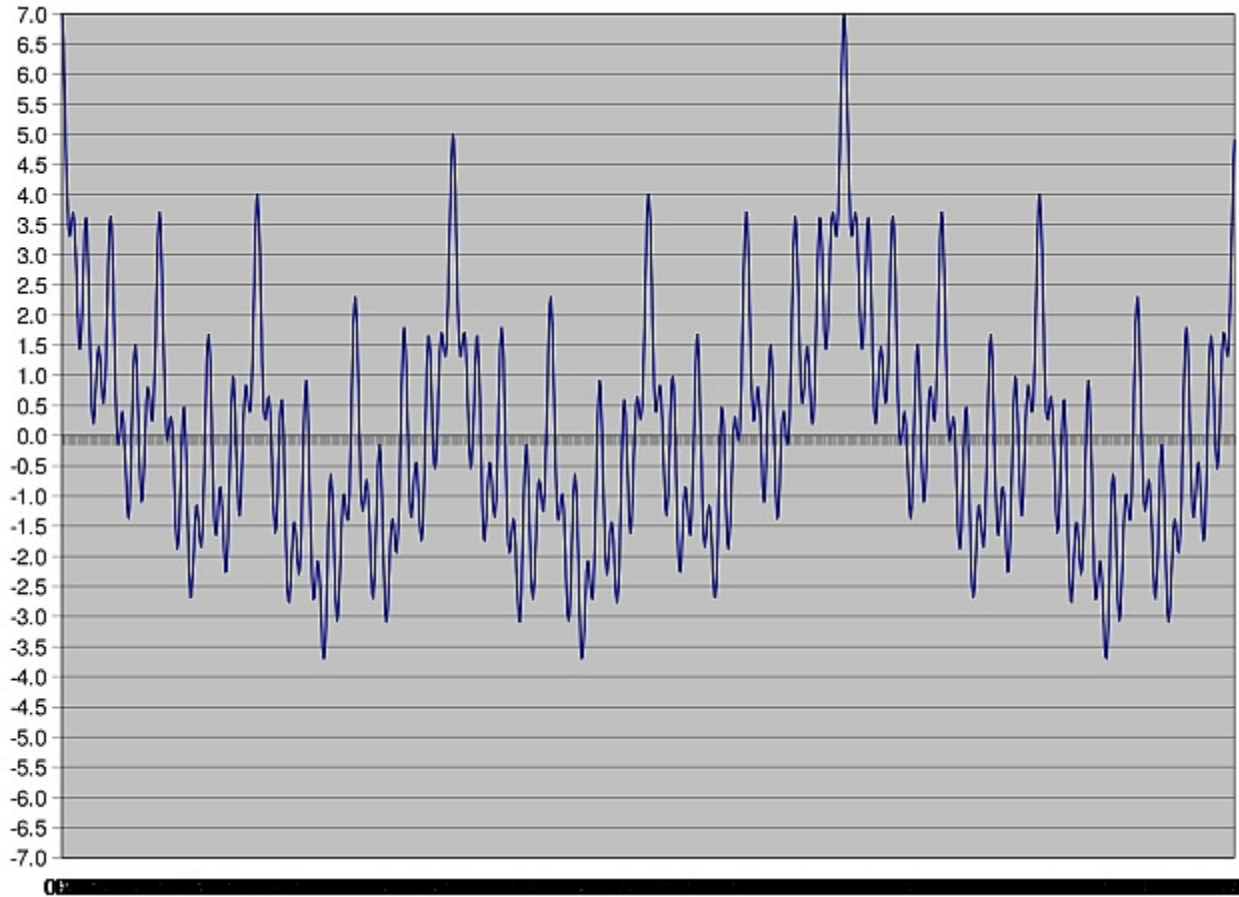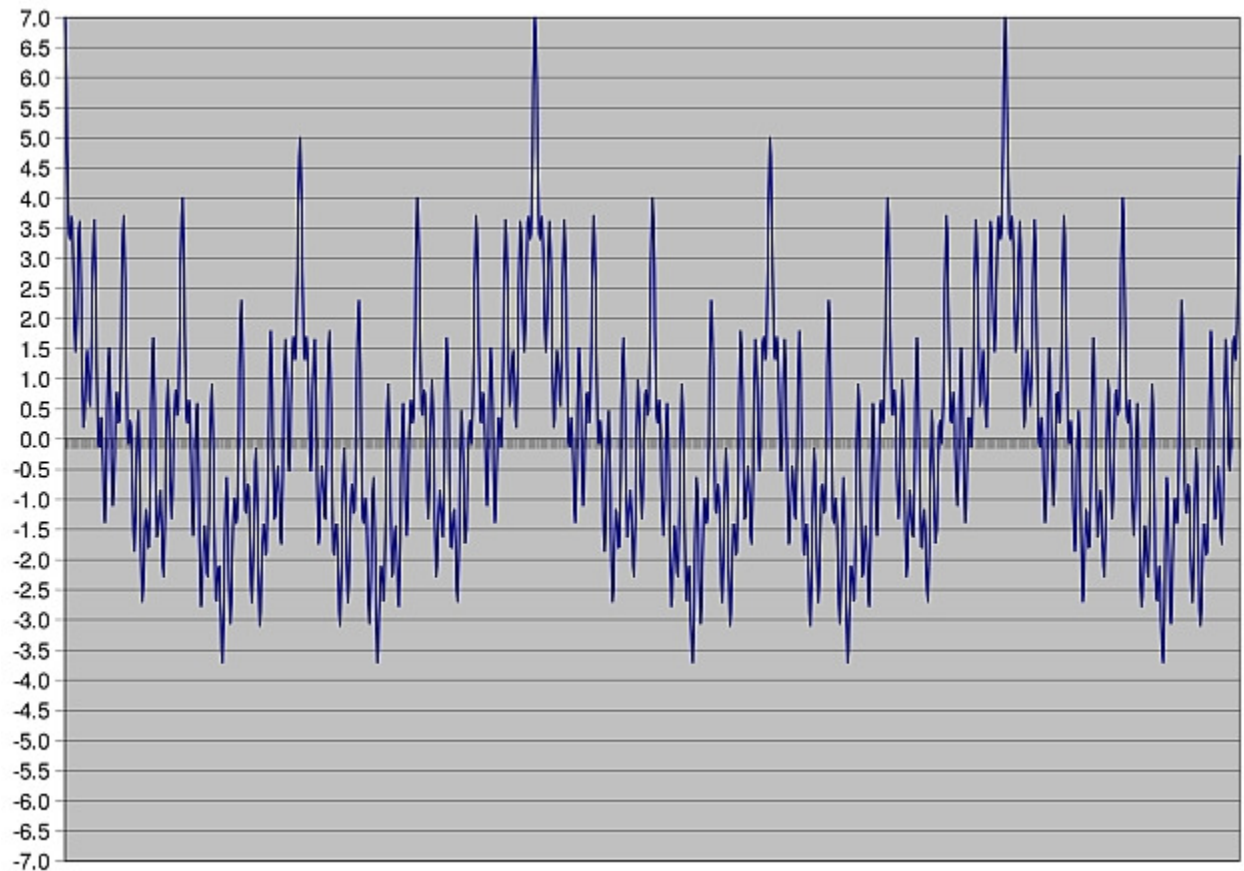
Third Order Harmonic
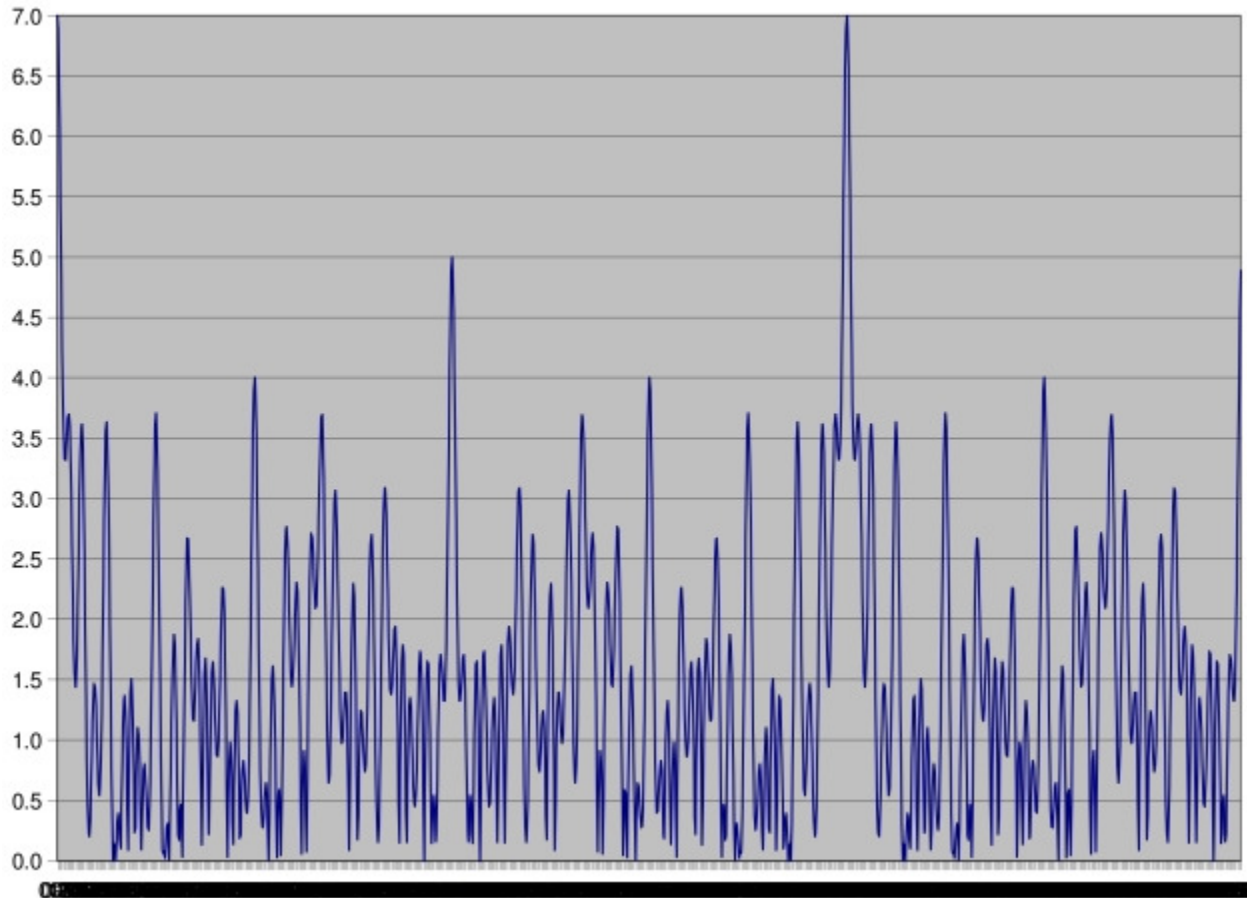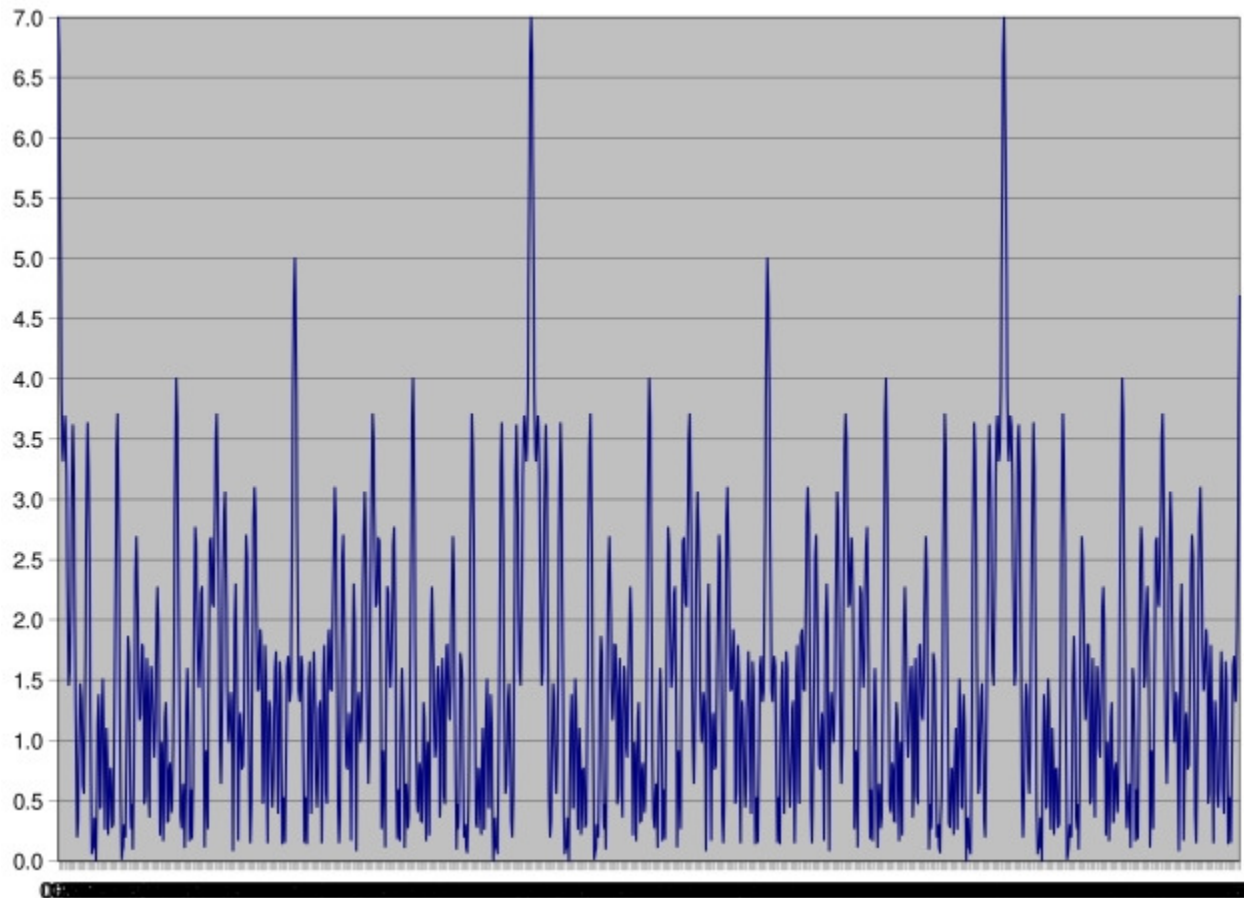
Third Order Harmonic as positive amplitudes

Third Order Harmonic Sensitive Points

Again we are seeing a match with the related 120 degree Trine, 60 degree Sextile, 30 degree Semisextile, and 150 degree Quincunx Aspects. We also see similar interpretational strength and Orb size correlations.
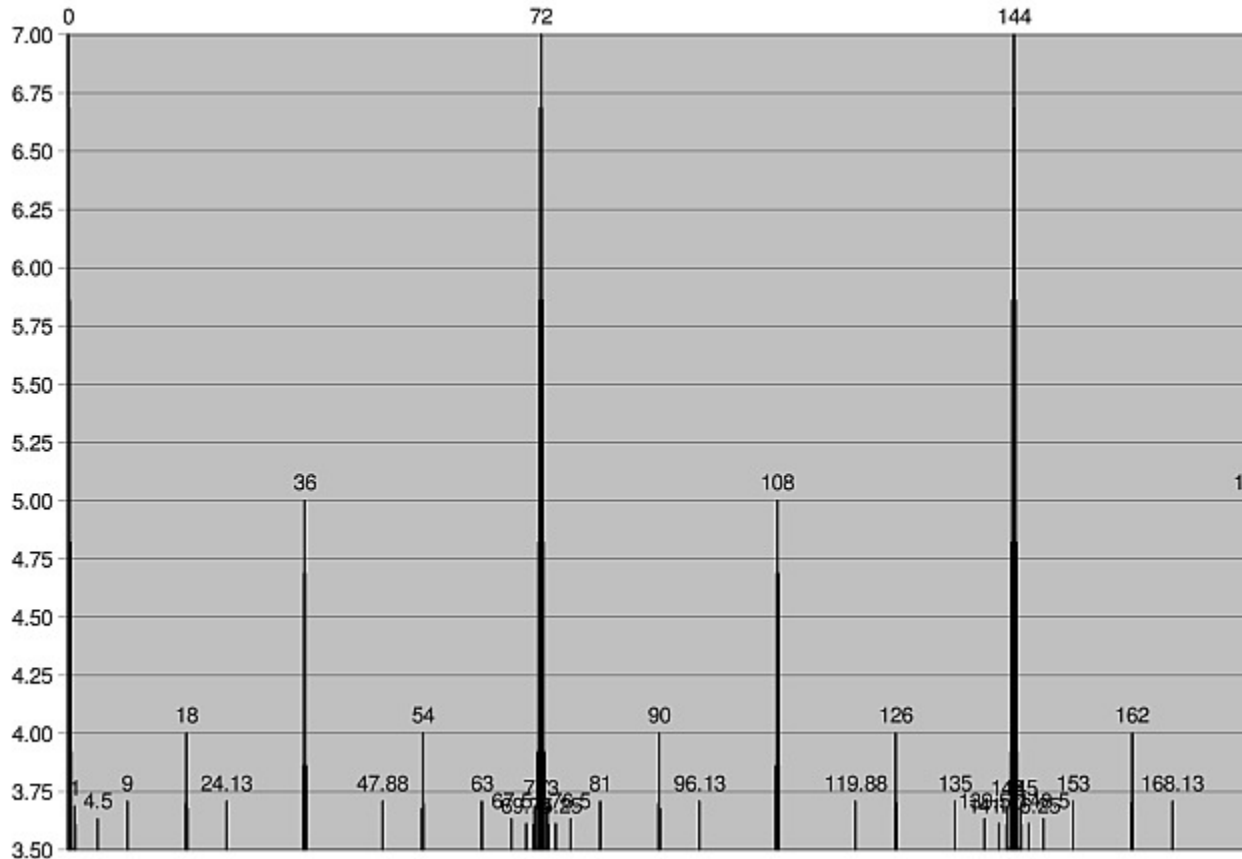
However, the 90 degree Square, 135 degree Sesquiquadrate, and 180 degree Opposition also appear on this chart, and they are NOT related interpretationally with the Trine, Sextile, etc.. This is problematic, but let's see if the fifth order harmonics can add clarification.

Fifth Order Harmonic

Fifth Order Harmonic as positive amplitudes

Fifth Order Harmonic Sensitive Points

Expectations were that we would also see the same patterns with the fifth order harmonic, and as can be seen in the above charts, we do! And here again, as with the third order harmonic, we are also seeing the interpretationally non-related Square, Sesquiquadrate, and Opposition.

But these 2nd, 3rd, and 5th harmonics do not stand alone, but are always resonating simultaneously, and interacting with each other. So lets take the final step and combine the above three plots together. When we do, we see that the plot almost perfectly matches up with ALL the characteristics of Aspects, and if we further tweak the plot by proportionally weighing the harmonics based on their frequency, the Aspects match up exactly!
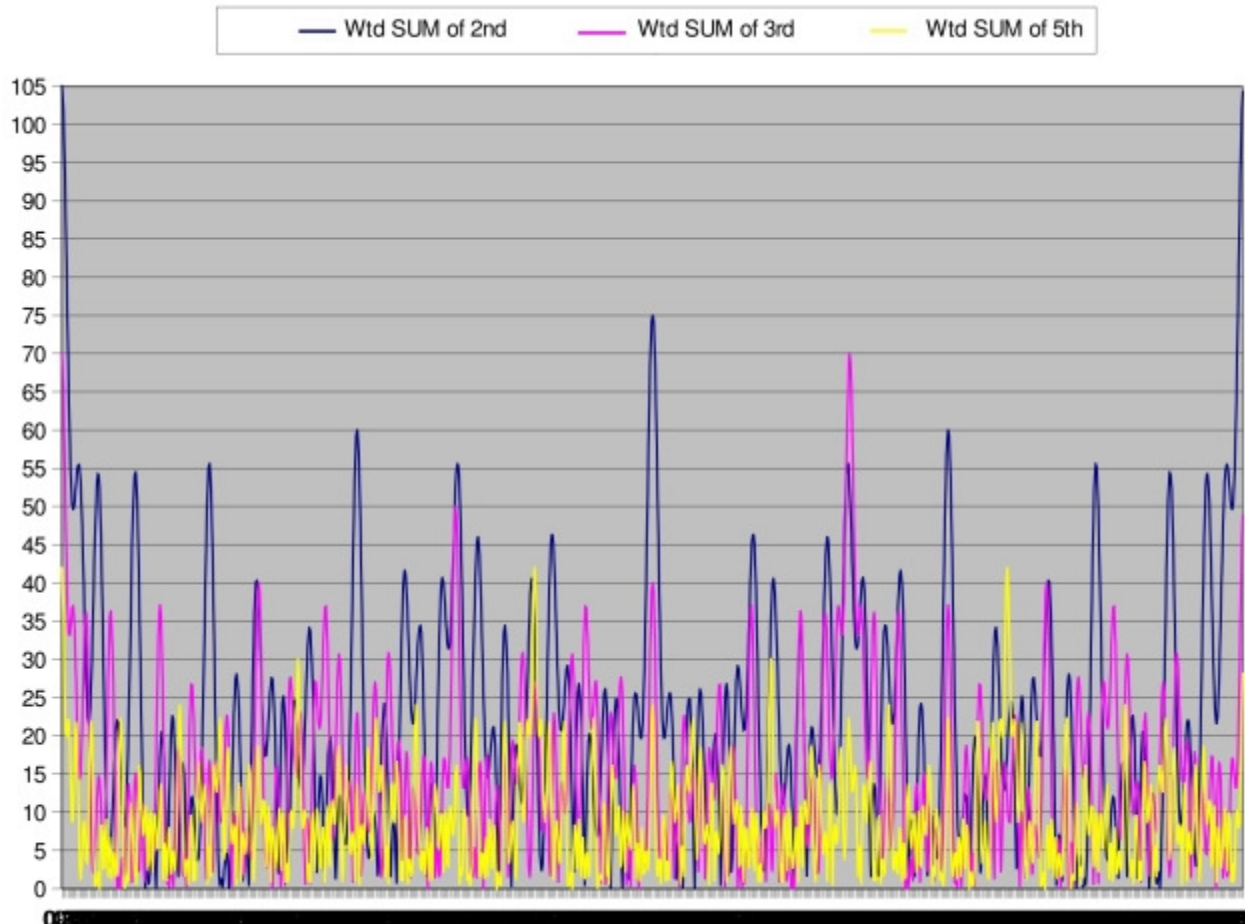
Example of overlayed successive harmonic order peak amplitudes after proportional weighting

Although I make no claim as to why Aspects work, I must conclude from the evidence that the harmonic interaction model is an accurate working model for describing HOW Aspects work, and I contend that my new model is the best model Astrologers now have at their disposal for defining Aspects in an Astrological chart. With this model we can identify significant Aspects, including Aspects that haven't been given much study, group Aspects into related interpretations, define an Aspects relative interpretational strength, and even define their exact strengths when they are outside of Perfection.

This model also helps us understand things that didn't make sense before. For example, when you discuss Orbs with Astrologers, you often hear the of the unusual observation that sometimes an Aspect that is still in orb, but a little farther from 180 degrees, seems to have a stronger influence than one a little closer. If you examine the above harmonic charts, you note that there is an interesting mini-peak occurring at about 177.38 degrees. This mini-peak would explain this apparent discrepancy.

Why higher prime numbers, such as the 7th and 11th, don't seem to have much influence, is also clearly understood by looking at the plots. The combination of the dampening effect and the closeness of these weaker Aspects to far stronger ones, is causing any effect from these Aspects to fade into the noise floor ("grass" as it is called), and therefore into obscurity.

Then there is the observation of the incongruous Square, Sesquiquadrate, and Opposition. They occur not just as 2nd harmonic peaks, but also 3rd and 5th harmonic peaks. Most Astrologers would have probably assumed that these three Aspects were only 2nd harmonic, as the Square, Sesquiquadrate, Opposition, and Semisquare seem related. But should they be considered such? The 90, 135, and 180 degree Aspects are always said to be disharmonious and difficult. But many Astrologers consider the Semisquare (45°) to be only an indicator of tension. Could the keyword for the 2nd harmonic then be only tension?
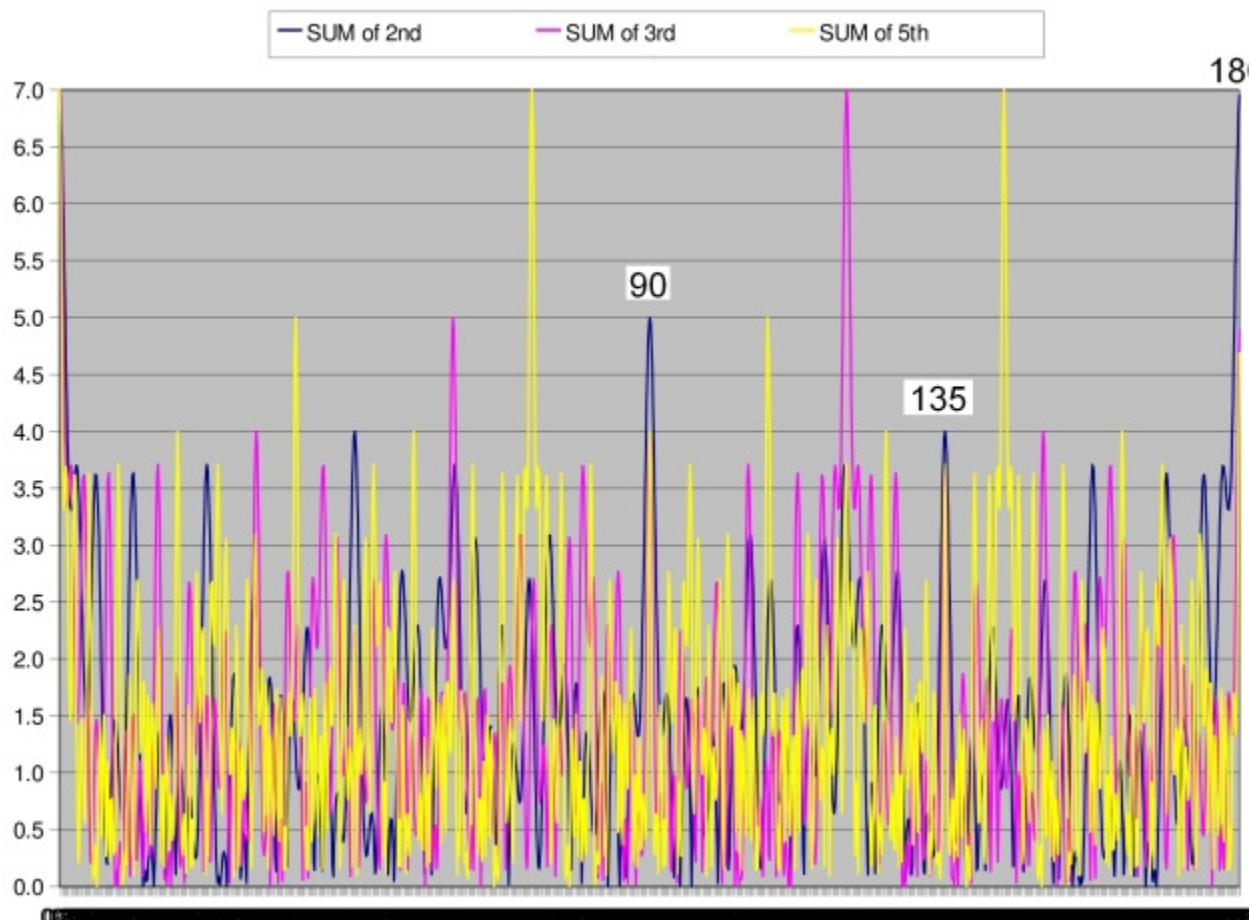

Illustration of how 90, 135, and 180 degrees overlap in an equal peak amplitude overlay chart

As can be seen in the plot above, the 2nd, 3rd, and 5th order harmonics do not stand alone, but are always resonating simultaneously and interacting with each other. Note especially the sensitive points of 90, 135, and 180 degrees, and the fact that at just these sensitive points, the 2nd, 3rd, and 5th order harmonics all exactly interact together. It seems then that this mixing together of the vastly differing 2nd, 3rd, and 5th harmonic influences is what is manifesting as the dissonance that is causing the irritating interpretation qualities observed in the Square, Sesquiquadrate, and Opposition.

In summary then, I hope that I have clearly shown that Aspects are NOT the result of inscribing or partitioning a circle. I also hope that I have clearly shown that Aspects are NOT numerologically correlated with a fractional divisioning of a circle either. Only the harmonic interaction model that I espouse here fully explains ALL the observed attributes of Aspects.

The end.