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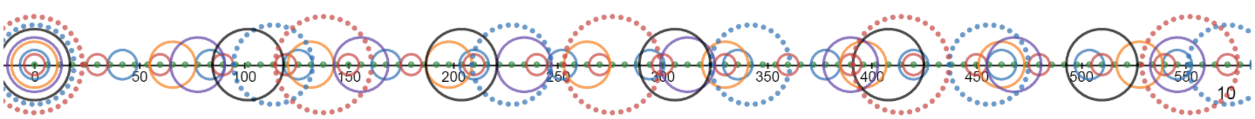
A Circle Driven Proof of the Twin Prime Conjecture

Abstract: Twin prime conjecture is proven from the observation that all composite odd numbers with factors greater than three occur in the cycle ($0p_m$, $1p_m$, $5p_m$, $\underline{6p_m}$). This draws circles with diameter $2p_m^2$, and inter circle interval of $4p_m^2$. For exclusively composite numbers we have $|p_m^2 \pm 6p_m|$.

We follow the convention of using p_n *to indicate an arbitrary prime number and* p_m *to specify primes greater than 3.*

The green circle has radius 1, passing through $x = 1$ and $x = -1$ at the origin, thus of diameter 2. This circle represents the complement to the *tonic progression*, which is the combined arithmetic progressions containing all the composite numbers with 2 or 3 as a factor (0, 2, 3, 4, 6). Hence, it visualizes the progressions $6k \pm 1$.

The larger circles are of prime radius for all primes between 4 and twenty-four 24, i.e. {5, 7, 11, 13, 17, 19, 23}. They pass through all composite odd numbers not divisible by 2 or 3. These are found in the progression ($0p_m$, $1p_m$, $5p_m$, $\underline{6p_m}$) such that the circles are centered on multiples of 6 with a radius p_m, so straddling consecutive instances of the explicit progression cycle mentioned. These circles are to scale, and for the range depicted here, the only relevant factors of composite numbers.



It is clear that there exist unaccompanied, or *lonely*, green, diameter 2, circles. That is, diameter 2 circles occur such that no circles of greater diameter coincide with their intersection of the number line. The patterns visible here repeat *ad infinitum*. Each circles' frequency is fixed, the period between consecutive circle edges is always $4p_m$.

The twin prime conjecture asks whether or not the green, diameter 2, circles will always be lonely or not. If there will always be lonely green circles, the conjecture is true. If there exists a point beyond which all of them are accompanied by at least one larger radius circle, the conjecture is false. But we know that all not pictured composite numbers have even bigger radii and longer inter-circle periods. This is a direct result of the formula dictating their diameter $2p_m$, and inter-circle period $4p_m$. So there must be lonely green circles at all points in the number line, because it is clear that the circle forming formula's circles' orbits precess with radii too big to continuously interfere with an object of radius 1. The only way to *infinitely ever after* not observe twin primes, (the progression $(0, 2) \in \mathbb{P}$) is to seek them with 0 situated over a composite number, or a number of the form $6x + 1$. Formally, let T *be the set of arithmetic progressions* $t = bx + a$ *such that* $t \in T \rightarrow \exists\, x' : \forall x > x',\ t \vee t + 2 \notin \mathbb{P}$. Then $T = \{p_n x + p_n^2,\ 6x + 1\}$. Hence there are infinite twin primes situated over $6x - 1$. ■.