The Clampdown **Effect**

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On The **Expulsion** of Super-Intelligence

ABSTRACT: There exists an implicit potential limitation in every physical discoveries that has been implemented and understood. However, the limitations can be bounded within a safe limit to prevent any constructing theory to be free from errors. As, it's the inert nature of the humans, to go far beyond the scope of experimental findings in order to pursue any studies with the sole help of logical reasoning and mathematics, the argument can be prevailed in the form of WEAK Clampdown Effect & STRONG Clampdown Effect. More, the theories are constructed out of physical nature, more the theory gets hypothetical without any finding evidence, but that does or doesn't actually justify the phenomenon, that too with the more increment of KARDASHEV Scale, more moderate ways of experimentation got developed curbing down the limitations within the human limit of 'ERRORS', that does can be neglected by approximation. Relationship being cross-judgmental on the basis of the computational limits and calculation accuracy, leading to a soft singularity, as a warning, that if computer powers cannot be checked on the basis of error approximations, then this may lead to the hitting of a hard singularity, that in phase with the forbidden gap (or after the optimum limit that arises at the core constraints of nature) to prevent the computation being carried off with respect to super-intelligence machines that are cognitive capability oriented future computers responsible for self growth & reproduction with more improvement algorithm, restricting all forms of humanity & constraints the human growth by virtue of limiting capacities of the humans as compared to computers.

WEAK Clampdown Effect – STRONG Clampdown Effect – KARDASHEV Scale – ERROR Processing – EXTRAVAGENT Curiosity – SOFT Singularity – HARD Singularity – ERROR Approximation

Philosophy Of Physics SUBJECT

There is a limit as to how much knowledge one can gain from this universe, about this universe, just by observing and studying, let alone be experimentation. The two modern pillars that stood as a giant source of limitless knowledge in this universe, are the big and the tiny. The big is the GENERAL THEORY OF RELATIVITY and the tiny is the QUANTUM THEORIES OF MATTER. However, due to the prominent nature of the "scale variance" or more specifically, as the two theories are not "scale invariant", i.e., to say, GR acts on large scales, while QM acts on tiny scales, and the point of 'amalgamation' of these scales are not perfectly defined by the modern theories of physics, either the reason might be, the existent physics breaks down or there is need of new physics, it is a fallacy of the existing physical law that, discrete set of mathematics have been used to make the "scale variant" to "scale invariant" by means of a globally defined continuous symmetries which are perfected by calculations but limited by the theories. Of course, one might argue that, to develop a consisting theory of the amalgamated or 'grand unified' physical law, one might tackle gravity in a clever way, just like increasing the spatial dimensions, to curb down the coupling scale, and making safer and safer approaches to "QUANTUM THEORY OF GRAVITY", the resultant theory is incapable to be verified by experiments because of the prevailing complexity of the engineering technologies. Standing at the KARDASHEV 0.73 Scale & a not so 'discovered "TOE" it may seems satisfying that, humans at least have the mathematics, but, the mathematics itself is perfectly valid or limited by errors is a grand question of nature as long as they have been experimentally verified. The most conjugate case is the string theory or M-Theory which to some extent acquires super symmetry to extend space-time symmetry beyond the 4-dimensions of nature and peeks into an utmost incredibly huge limit of 11-dimensions. Nature will always protects her symmetries and the more deeper physicists voyage, the more difficult it would be for the humans to explore the "hidden parts of nature" as nature becomes constrained at extremely large or monotonously small scales where the notion of space & time itself separates into distinct identity, thereby devoting us to restrict the "scale symmetries" to the extra large or extra small scales respectively. It is therefore time to define perfectly the dual nature of the CLAMPDOWN EFFECT as such;

- WEAK Clampdown Effect – There exists potential flaws in the mathematics that has been developed by physicists as, mathematics itself gets broken down into 'granules of inconsistency' when physicists tend to explore the mathematics by extending it to the deepest hearts of nature, which nature naturally forbids as an inert rule.

- STRONG Clampdown Effect – Even if physicists overcomes the engineering challenges and tried to construct machines for testing the previously predicted theories, there will always exists a 'SINGULARITY POINT" in the nature which limits every experiments beyond that limit to fail or show incorrect values even if the previously predicted theories are right. This in general, proves that, either through conjecture or through validation, an optimum limiting potential exists for both the theories and the experiments beyond which there lies a forbidden zone which humans can never be explored even if they are at a high KARDASHEV Scales.

Notes: Reference of the cover image (modified as per the need of the paper): Cruz, M., & Coontz, R. (2013). Alien worlds galore. *Science, 340*(6132), 565-565. doi:10.1126/science.340.6132.565

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Methodology…

The frontier of theoretical physics is huge. The domain of perspective is beyond any comprehension. However, there exists a minimum scale when we assume all the fundamental constants to be unitary and that is the Plank's regime. There are several constants related to Plank's, I.e., time, length, mass etcetera. But, the main focus lies on the limit set up by those constants as beyond which the eternal concept of space & time will dismantle into separate pieces with a beheaded notion of falsified physics. Similarly on the very large scale, we have the upper limit of the number of vacua states as 10^{500} but, that too is purely theoretical. There is no such concrete experimental evidence for it. Else not, we might provide a value of a specific segment of the universe, that is observable domain as 93 billion light years wide. There are more numbers like Googolplex, Graham's number but that too is too much hypothetical that, it can be treated as a flex of clever mathematics. Therefore, locally physics seemed to be boundless & endless, but non-locally, it is beyond any comprehension. The propounding attitude towards extravagant curiosity is what drives the theoretical physics and kept is alive till the "SINGULARITY POINT" has been reached. Here, the singularity is not defined as a black hole singularity, rather it is to be seen as the commencement of a forbidden gap where the logical reasoning of theoretical physics starts to be hypothetical, & experiments yield no answers. For, this, one should blame the curiosity driven physics rather than the extreme computation powers of the computers as computation itself one day dominates in the form of AI (or actual intelligence[+] rather than artificial intelligence) and lead to the extremity of the human inputs to get a more subtle outputs.

Of course, this leaves no doubt in rational thinking that, every aspect of intelligence growth has an 'optimum limit', so called "SINGULARITY POINTS" where NATURE ultimately conquers the humans by preventing them to become omnipotent. This gap between NATURE & Humans could be defined as a 'ERROR PERSENTILE' which will grow more sharply when one enters the strips of the forbidden gap by means of his/her extravagant curiosity. These exponential growths of ERRORS, would not only prevent, the physicists from false-computed-results but also provides a chain of back reactions that will curb the persistent growth and become harmful for the theoretitians*. This concludes that mother nature doesn't allow herself to be examined at the very extreme scales. There has to be a 'forbidden gap' irrespective of the development of the KARDASHEV Scales.

Some physicists often argue that, theory can't results in an experimentation validation because of the engineering challenges, however, this is partially true. As because engineering is nothing but applied physics, so, experimentation may give hope to the physicists as related to the pulsating existence of their theory but the crisis of validation remains same, i.e., it can't be crossed beyond that "SINGULARITY POINT" and even if it reached that point, then all we get is a dataset of errors and unfruitful, unsatisfied results.

One way of looking into the means of validations of the theories can be sorted out in an alternative way, like, if this type of experiments failed, then we can try the other form of experiments which is less complex than the previous one and less time consuming but can give either the same results or the improved results, however, such alternatives can only be chalked out when we have regained the "POINT OF NO RETURN" which actually is the innermost human-side boundary of the "SINGULARITY POINT". Now, the basic question that arises is that, when will the "POINT OF NO RETURN" be approached, the answer is same, in KARDASHEV 3.0 Scales or even higher scales as predicted by the current physical theories.[1-7]

To conjecture & mathematicize the WEAK Clampdown Effect & STRONG Clampdown Effect, it is absolutely necessary to label some variables as related below,

$$W_{CL-DN} \rightsquigarrow WEAK\ Clampdown\ Effect$$

$$S_{CL-DN} \rightsquigarrow STRONG\ Clampdown\ Effect$$

$$E^{e} \rightsquigarrow exponential\ increament\ of\ errors$$

$$N^{+} \rightsquigarrow point\ of\ no\ return\ fron\ natures\ end$$

$$N^{-} \rightsquigarrow point\ of\ no\ return\ fron\ humans\ end$$

$$D^{e} \rightsquigarrow exponential\ increase\ in\ data\ driven\ calculations$$

$$C^{*} \rightsquigarrow critical\ computing\ limit$$

$$S_{0} \rightsquigarrow singularity\ point$$

$$vkK^{\frac{e}{V}} \rightsquigarrow KARDASHEV\ extensional\ \ limit$$

$$f(T) \rightsquigarrow time\ factor$$

$$B^{V} \rightsquigarrow backreactions$$

$$A^{e} \rightsquigarrow stringency\ of\ the\ nature$$

Notes:[+]The pioneer of actual intelligence is Dr. Catherine Demetriades of CERN from Cyprus, Emails: Catherine.Demetriades@cern.ch, Catatrix@cxaitechnology.com & Dr.catinthelab@gmail.com . She is the founder of the Actual-Intelligence Robot **AUTIZMO** (The CXAI Technology) & her company "Catatrix In The Matrix".
*I'm not discouraging the theoretical physicists, rather I'm just setting up my point.

Hence,

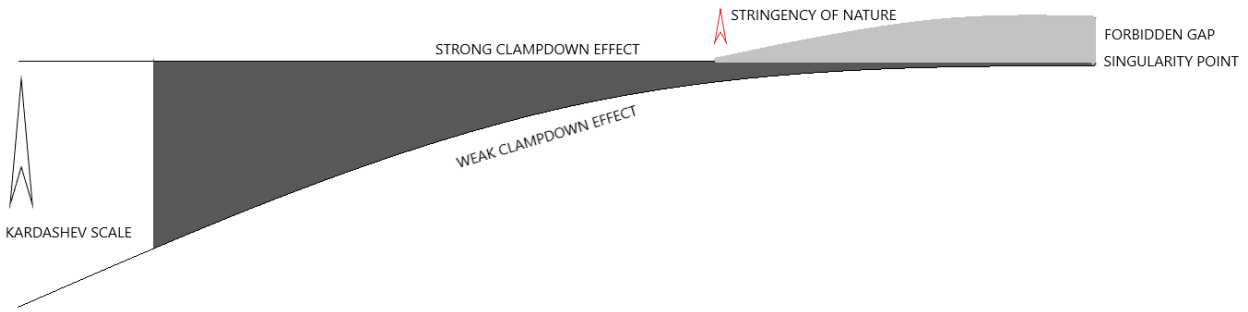
WEAK Clampdown Effect can be defined by the formulae,

$$W_{CL-DN} \Longrightarrow E^e \times D^e \times vkK^{\frac{e}{v}} \times A^e \times f(T) \equiv 0$$

STRONG Clampdown Effect can be defined by the formulae,

$$S_{CL-DN} \Longrightarrow D^e \times vkK^{\frac{e}{v}} \times f(T) \times B^V \times S_0 \times C^* \times E^e \times A^e \times (N^- - N^+) \equiv \infty$$

Where, $e\ takes\ the\ value\ from - \infty\ to + \infty$ & $v\ takes\ the\ respective\ values\ of\ 1, 2, 3$ ... the answer would always be on the boundary conditions of 0 & ∞. The respective gap between them, or, in mathematical form $interval[0, \infty]$ could be minimized as one approaches from W_{CL-DN} to S_{CL-DN}.



To understand this picture, it is first necessary to understand the numeric variables that are connected with the STRONG & WEAK Clampdown effect. Hereto, I shall use the perspectives from both the effects & not only a single effect which describing the variables. In the picture, this has been clear that, if we imagine a coordinate horizontally from left to right as time, then, the more the temporal increment occurs, the more WCE moves towards the SCE. WCE acts as an asymptote, being, getting closer to SCE upon the increment of the KARDASHEV Scale. Just, as the far down the middle of the image, there acts as a red marker arrow, incrementing vertically as the nature's stringency point. This point is crucial in our understanding of the singularity and the forbidden gap. So, what exactly is happening here as time passes by? With the advancement of time, both the theoretical & technological advancement occurs while, upon going ¾ th of the line, the asymptote line (or the WCE) approaches very close to the SCE and it can be safely assumed that, humans have already been starting to engage themselves (in both theory and experiments) to probe the farthest of the farthest fathoms of natures heart and this results in the nature starting to get more solid and stringent as regards to penetration of humans for knowledge. This stringency occurs, when both the experiments and theory matches in equal proportions, thus this requires quite a high KARDASHEV Scales. The stringency of nature is increasing as WCE got more asymptotically close to SCE with a more further advancement of a 'special zone' approaching towards singularity point. It is to be remembered that, the singularity point can't be a junction between WCE & SCE, perhaps it is in infinity, but in reality, there is no junction but just, SCE & WCE are getting closer and closer. The more the distance from WCE got closer to SCE, the more, the 'forbidden gap' increases which directly implies that, nature is getting more stringent. This forbidden gap will increase in due time & its that gap which restricts us to form a globally defined scale invariant symmetries. The more, we approach, the more the forbidden gap increases (which is a two way gap! as I will discuss very soon) & this results in the "back reactions" which ultimately increases the "error percentile" in both the theory and the experiments.

$$point\ of\ no\ return = \begin{cases} (N^- - N^+), & from\ humans\ end \\ (N^+ - N^-), & from\ natures\ end \end{cases}$$

It needs to be remembered here that the stringency of the nature is not a one way point. On one side, it's a one way point for the humans and on the other side it's a one way point for the natures. The boundaries between these two 'forbidden gaps' as $\partial(N^- - N^+)$ & $\partial(N^+ - N^-)$ from humans side & natures side respectively, is to be notionally determined by virtue of the degree of stringency or $D(A^e)$. The difference of the boundary regions $\{\partial(N^- - N^+) - \partial(N^+ - N^-)\}$ strictly coincides with the asymptotically minimal gap between SCE & WCE. Therefore, the forbidden gap is in essential could be summarized by the equation,

$$D(A^e) \approx (N^- - N^+) \bigoplus (N^+ - N^-)$$

And, the boundary is satisfied by the wedge of,

$$\partial\big(D(A^e)\big) = C^* \bigwedge {\sim}S_0, \qquad C^* \in \partial(N^- - N^+), \qquad {\sim}S_0 \in \partial(N^+ - N^-)$$

If D^e be the exponential increment of data driven calculations & E^e be the exponential increment of errors, then a particular error function $Pf(D^e \times E^e)$ could give rise to the stringency of the nature A^e & backreactions B^V as,

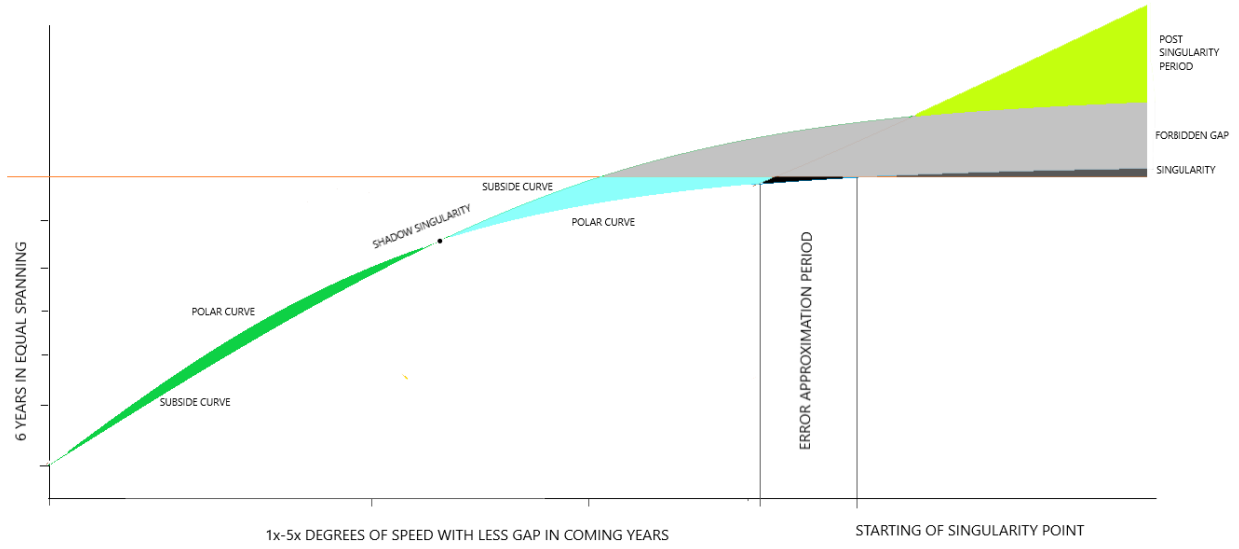
$$A^e = \bigcup_{\substack{Pf(D^e \times E^e) \in D^e \\ Pf(D^e \times E^e) \in E^e}}^{Pf(B^V)} C^* \bigwedge {\sim}S_0$$

And this ushered the ultimate reality of the nature.

This "SINGULARITY POINT" can also be predicted as the "Technological Singularity" (TS) which as described above is such a uncontrollable growth of technologies, that, the backreactions are inevitable which can do unforeseen changes in the human civilization. The most popular version of TS is called the 'INTELLIGENT EXPLOSION' where there would be self improvement cycles and this results in a rapidly expulsion of intelligence that reproduces very fast in the form of a superintelligence that quantitatively surpass all the human intelligence. Because, every growth has an optimum potential for growing or developing or having an optimum limit, beyond which it renders backreactions that could effect humanity as well, which is a fearsome thing as beautifully visualized by "I, Robot"[8] movie starring Will Smith. This could mark the end of human era which i would like to call as the potential hazardous backreaction that can self-upgrade itself into a more sophisticating way in their own limits by destroying the human limits. The only factor responsible for such thing is the AI or Artificial Intelligence as predicted by notable scientists like Elon Musk & Stephen Hawking.

One of the potential benefits would be Seed AI which by means of amplification of human intelligence or through extensive modernizations of AI could perform more inventive problem solving skills than that humans are ever capable of. However, we should be more concerned on the danger side because, even if, such an outbreak occurs in maximal future, they can reproduce themselves keeping humans as their labors which is surely a factor of debate among scientific communities. And it should be remembered that, as soon as AI surpass human intelligence, they shall develop their own Type-3 intelligence and cognitive facilities which is troublesome as per the backreactions are concerned.

Although its difficult to say what a post-singularity world would be like, but as far as this paper has been concerned, the backreactions should hamper not only the human intelligence but also the machine intelligence (due to the pretensions' fact that, everything has an optimum limit), but, that thing, if not controlled then, the slowly submerged intelligence could conquer the backreactions and a new era of life could be started with the beginning of a post-singularity period, in which either humans are gratified or treated as labors with 'might' be the ending of the human civilizations.



To cultivate the minute details, it is necessary to explain every single parts of this graph. The vertical axis takes the value of 6 years, 6 years should be the total lifetime of the intelligence (human intelligence + machine intelligence) as far as its concerned here with the maximum boundary conditions of the closed intelligent system to be 6 years. Here, for purpose, one can multiply each 1 of 6 years with a suitable value like say 400 for 6 * 400 years. Any multiplicative value should be considered provided, the value remains fixed for 6 intervals of time. There is also no hard & fast rule for the separation to be only fixed at 6, it could have been any higher or lower than 6. For, the purpose of graphing, it has been considered as 6. Similarly, on the horizontal case, the respective speed has been considered. Here, the speed has been taken as (6-1)x or 5x as the last part is allocated for Post-singularity Period. So, in the first year the speed increases to 1x, while the second year it becomes 2x… & so on, to the fifth year it becomes 5x with the last year its been neglected as the speed can jump exponentially due to "intelligent explosions'. Therefore, the gap between the speeds are getting narrower as time passes by, means, the more increment of speed occurs with the passage of time in a shorter period than before. From, one year, the curve started being either a polar curve or a subside curve. The difference between these two types of curve is that, the difference between the two curves is that, the polar curve increases initially but falls after the show singularity point $\sim\widehat{SS_0}$ is reached. This shadow singularity point has a special application to the "ERRORS APPROXIMATION" as I have concluded in the "abstract' that, there should be a possible chance for the singularity to be avoided by 'ERRORS APPROXIFICATION' (EA) only if the human race is intelligent enough to do that (I will come to this point a bit later!). the other form of curve is the subside curve that rises on a slow pace initially but rises after the shadow singularity is concerned. Humans, however, if preferred the growth as a polar curve then there can be chances of EA.

The singularity point $\sim S_0$ could be described finely by the equation as previously seen by,

$$\partial\big(D(A^e)\big) = C^* \bigwedge \sim S_0\,, \qquad C^* \in \partial(N^- - N^+), \qquad \sim S_0 \in \partial(N^+ - N^-)$$

The shadow singularity is an initial, much earlier version of a singularity-like situation that lies at the arbitrary intersection of the polar & the subside curve. If humans started at a high pace initially but lowers its pace at the outbreak of the 'initial indication of intelligence-like explosion' then, there lies a chance for the EA-Period to occur which cancels the singularity phase. But how exactly EA does that? And we have to remember that, if humans choose the polar curve, then only this is possible while if they choose the subside curve of growth, then this is not possible as because, in reality, intelligence tends to boom day by day & not remain as a constant throughout the period. So, it is completely feasible for the humans to encounter an EA period, provided, they have to culminate the exact point of $\sim\widehat{SS_0}$ when it arrives.

Therefore, the relation between the two types of singularity could be given by,

$$\sim\widehat{SS_0} \cong \frac{1}{\sim S_0}$$

And if in general the shadow singularity is approached, that is, if humans are aware of the indication of the intelligence boom in future then, they can act accordingly by subsiding their technologies, however, this in real life is also not feasible, as because, it's the tendency of the technologies to expel out and diverge in an ever increasing growth to enter into the phase of real singularity without EA phase. If we denote the EA as ${E^e}_\alpha$ then, the equation could be defined in terms of the nature stringency as,

$$\lim_{e \rightrightarrows C} A^e = \bigcup_{\substack{Pf(D^e \times {E^e}_\alpha) \in D^e \\ Pf(D^e \times {E^e}_\alpha) \in {E^e}_\alpha}}^{Pf(B^V)} C^* \bigwedge (\sim S_0)^{-1}\ , \qquad \exists C \notin \langle 0, \infty \rangle, \qquad B^V \ \& \ D^e \ are\ a\ tiny\ value$$

Hence, if a part boundary of polar curve is denoted as $\partial\Delta_P$ and subside curve is denoted as $\partial\Delta_S$ then beyond the shadow singularity $\sim\widehat{SS_0}$, this could be defined by the relation as the linking point of forbidden gap of limit $X_{P-S}\big(D(A^e)\big)$ as, neglecting the curve, the perpendicular on the Sky-Blue + EA region h could be given in the form of surface area as,

$$\iint_{X_{P-S}(D(A^e))}^{\partial\Delta_P, \partial\Delta_S} \frac{1}{2} \times \partial\Delta_P \times h$$

The EA could be performed as,

$$\left(\iint_{X_{P-S}(D(A^e))}^{\partial\Delta_P, \partial\Delta_S} \frac{1}{2} \times \partial\Delta_P \times h\right) - \iint {E^e}_\alpha \equiv \lim_{e \rightrightarrows C} A^e = \bigcup_{\substack{Pf(D^e \times {E^e}_\alpha) \in D^e \\ Pf(D^e \times {E^e}_\alpha) \in {E^e}_\alpha}}^{Pf(B^V)} C^* \bigwedge (\sim S_0)^{-1}, \qquad \exists C \notin \langle 0, \infty \rangle, \qquad B^V \ \& \ D^e \ are\ a\ tiny\ value$$

If the polar curve starts & joins as a subside curve, then, no doubt, intelligence would be booming but, it will very soon lead to the forbidden gap. so, to prevent the forbidden gap and to rule out singularity, this is necessary for the 'non switching' of the curves & let the polar curve remains the polar curve without any sort of 'geodesic transfusion' or the 'Jacobi fields'*[+]. Yes, one thing could be said in fact, that, the processing speed has been checked and this might results in the errors, but, ultimately, those errors could be assembled and approximated by an error approximation process. The above equation does this by restricting the forbidden part. And, to reconcile the speed that the Before-EA period curbs down, humans have to take care, by examining that, even after the 'shadow singularity' has been achieved, there should not be any way to encourage the blooming of the super-intelligence (that is, on the verge of getting developed). Now, the question, of whether that intelligence boom could be checked by the 'EA' period, or, is it a natural property of human induced technological growth to attain a 'post-singularity' period' is a time-will-say thing and its difficult to assume right now. Because, standing at the 0.73 K' limit, to reach the 2 K' limit, it needs a century and to reach the 3 K' limit, it would take us 10,000 years. So, examine & at the same time predicting is such a far-fetched thing. In the 'post-singularity' period, the speeds of processing power (I'm not referring to Moore's law here!, rather in a more simple sense), the speed will not grow linearly like 1x, 2x, 3x, 4x, 5x with the time gap between each 'x is getting reduced in each successive gaps, then there exists a 'singularity' and the speed will grow exponentially with such an overwhelming effect, it humans will naturally fade away in front of the computer powered machine intelligence.

Note: In the last equation, it has been shown that, the EA boundary zone if could be eliminated from the $\iint_{X_{P-S}(D(A^e))}^{\partial\Delta_P, \partial\Delta_S} \frac{1}{2} \times \partial\Delta_P \times h$ and substitutions could be done from $\sim S_0$ to $(\sim S_0)^{-1}$, then the potential flaws of singularity could be avoided with an appropriate error approximations as required.

*[+]Through the shadow singularity points, there exists 4 different types of geodesics combinations (if we consider each curve as a geodesics) and they would transform through Jacobi fields. The 4 combinations are Polar Curve – Polar Curve, Subside Curve – Subside Curve, Polar Curve – Subside curve, Subside Curve – Polar Curve. Therefore, if each curves could be assigned as a smooth parameter family of geodesics ϵ_g, with $\epsilon_O = \epsilon$, then the Jacobi field, in the infinitesimal neighborhoods of shadow singularity points, could be assigned a parametric value, as an equation, $J(t) = \frac{\partial \epsilon_O(t)}{\partial t}\Big|_{O=0}$. The vector field would satisfy the Jacobi equation as, $\frac{D^2}{dt^2} J(t) + R\big(J(t), \dot{\epsilon}(t)\big)\dot{\epsilon}(t) = 0$, where R is the Riemann curvature tensor, D is the covariant derivative, & t being a parameter of the geodesic, $\dot{\epsilon}(t) = d\epsilon(t)/dt$ is the tangent vector field.

If you watched carefully, then you will find that, what I have been trying to explain & extrapolate is the WEAK Clampdown Effect but not the STRONG Clampdown effect, which is perhaps because of the fact, that, SCE is beyond the present capacity to discuss from the lowest scale. Here, I have considered the limits that has been put down by Soviet astronomer Nikolai Kardashev in 1964, so as to say the Type I civilization needs 10^{16} Watt of energy, the Type II needs !0^{26} Watt of energy & Type III 10^{36} Watt of energy. And a Watt = Joule/second. One important thing to conclude is that by increasing 4 magnitudes of 10^{36} J/S, i.e., 10^{40} J/S, one can easily remove the Higgs field from a cm^3 of a particle volume and its attainment of speed of light is plausible without any violation of relativistic principle. There are still extensions of the scale like Type IV & Type V civilization but we will not consider it here. Any Type III civilization, capable of harnessing the energy scale of its own galaxy will consume the luminosity of the entire Milky Way at around 4 * 10^{36} watts. If we consider the Landauer's principle which in principle sets a lower theoretical bound on the computational power for energy consumption** as $KT\ In\ 2$ that can be consumed per irreversible state change where K is the Boltzmann constant & T is the operating temperature of the working machine. Now, on a time period of 10^9 to 10^{10} the CMBR would decrease exponentially, that has been argued to enable 10^{30} computations per unit of energy. This lower bound is subject to Reversible computing, where T couldn't be made lower than 3 Kelvin's, the temperature of the CMBR is computed and amalgamated to the computational power without spending more energy on cooling than saved in computation.

Now, on comparison, I could have taken the energy scale of Type IV (which many of the readers may ask!), but I didn't as because, on a scale of the visible universe, the energy limit would be 10^{45} J/S, i.e., beyond the speculation of the current understanding and may not be possible and that sort of civilization could not be detected, because of its activities being indistinguishable from nature. Therefore, its better to speculate the energy scale of the Milky Way & equating it to the maximum computing power.[++]

The Sagan limit, as proposed by Carl Sagan could describe, the computations based on the civilizations "K" value as given by the formulae,

$$K = \frac{In\ P - 6}{10}$$

Where P is the power output & K is the Kardashev rating of the scale which approximately equals to 0.73 which if taken as the base value of the present civilization scale, then, writing $b_{0.73}$^^ we could prescribed the computational scale based on Type I, Type II & Type III civilizations. And hereby, I shall describe the shadow singularity as the soft singularity & singularity as the hard singularity. The set of equations that would follow be,

$$vkK^{\frac{e}{V}} \approx vk\left(\frac{In\ P - 6}{10}\right)^{\frac{e}{V}} \equiv b_{0.73}vk^{\frac{e}{V}}$$

Putting the $KARDASHEV\ extensional\ limit\ b_{0.73}$ as 1, 2, 3 with $e \in -\infty, 0, +\infty$ & $v \in 1, 2, 3$ for Type I, Type II & Type III respectively, the external limits to be computed as,

For Type I Scale;

$$b_{0.73}vK^{\frac{e}{V}} \approx 1k^{\frac{-\infty}{1}} = 1k^{\frac{1}{\infty}} = 1$$

For Type II Scale;

$$b_{0.73}vK^{\frac{e}{V}} \approx 2k^{\frac{0}{2}} = 2$$

For Type III Scale;

$$b_{0.73}vK^{\frac{e}{V}} \approx 3k^{\frac{\infty}{3}} = \infty$$

Therefore, it is evident, that, hard singularity would be hit at the end of the Type III Scale, but, it is important to determine the time of the soft singularity $\sim\widetilde{SS_0}$ which would be at any time between Type II & Type III Scale, as noted below.

If I consider the middle point of the Type I & Type II, then the energy consumption would be a mean, i.e., $\frac{10^{26}+10^{36}}{2}$ J/S or 5 * 10^{35} J/S & for this 2.5 scale, if I compute the soft singularity point then, its determined by,

$$b_{0.73}vK^{\frac{e}{V}} \approx 2.5k^{\frac{0+\infty}{2}} = \infty$$

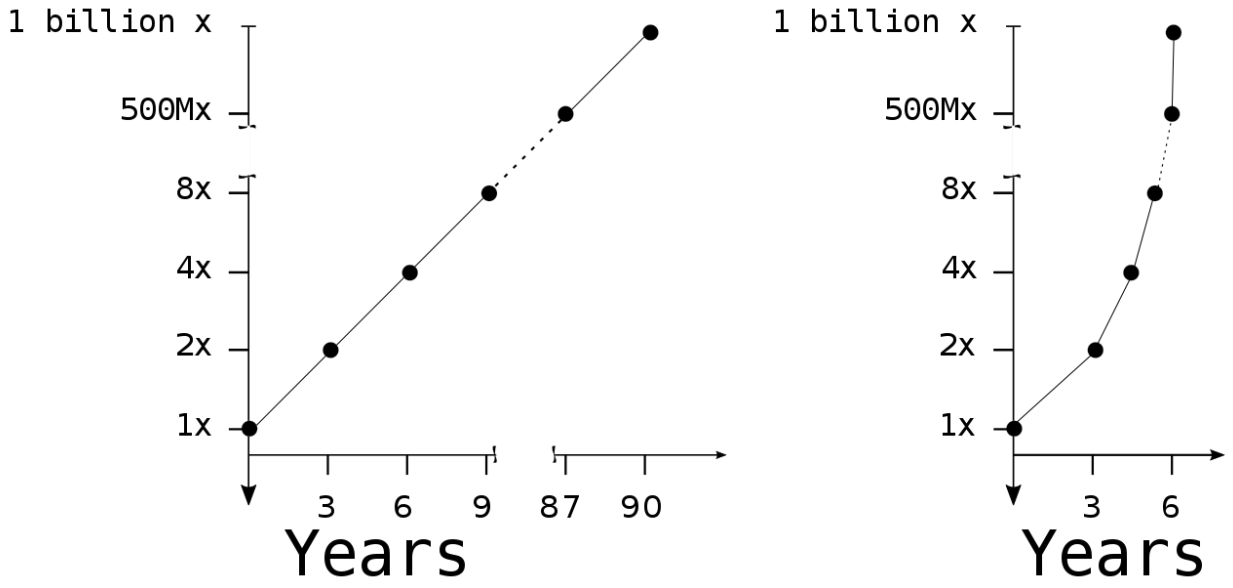
Which is a singularity, & in case of any value of v like 2.1, 2.2, 2.3…. 2.9 when the value of e is $\frac{0+\infty}{2.1}, \frac{0+\infty}{2.2}, \frac{0+\infty}{2.3} \ldots \frac{0+\infty}{2.9}$ there will arise a soft singularity with a mean energy value of 5 * 10^{35} J/S.

Note:

**The extreme limits of computations are governed by some factors, which are necessarily the amount of data storage performed within a given amount of mass, volume, energy.

[++]I have been forced to retain this calculation, to entail the validation of the computation as regards to the civilization scale.

^^I'm counting every limits on the basis of the present base.



Picture Credit: (Wikipedia), on the mutual comparison of the humans Vs. AI in terms of computational reproducibility. Image is not as per scale of this paper.

As according to Moore's law, computing power doubles after every 2 years, there is no hard & fast logic, as to when will the human intelligence gets doubled, which arises a question of the intelligence evolution. From, this paper, we get to know, the soft singularity being a span of time between Type II and Type III Kardashev Scale, when the AI would be equilibrium with that of humans. And, we have found a hint, that there would be a hard singularity or so framed as 'technological singularity' when the computing power reaches an optimum limits, that indirectly dictates the norm that, the intelligence of the machines would be so high, that the Level -3 cognition has been reached & even beyond that point, such that they become aware of the Anthropic principle, which makes them conscious about the universe & precisely their position in this universe, & humans would find a more advanced competitor which is not at all good for the human kind. This results in the machines capable of thinking, dreaming & imagining, that too along with giving birth to their offspring, i.e., self reproducing. Having been able to do that, the machines would conquer the whole human race and would treat them as a minor community, as portrayed in I, Robot & LUCY, so, it is evitable that, we have to check ourselves at soft singularity by means of ERROR APPROXIMATIONS (EA) before hitting hard singularity & the end of the humanity. To do so, we have to realize that, EA could have been done, in any span of time between Type II & Type III phase, but the question is how? That is, we have to avoid the making of the extremely intelligent AI & compute the answer to some moderately intelligent AI & approximate the error for a reasonable value of our answer. [8-22]

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