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Generalization of Various Kinds of Scalar Fields Exist in Universe and Their Mathematical Representations

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A B S T R A C T

This particular article is devoted to questions remained to answer in my former trend of obtaining the fundamental equations which govern various outstanding properties of the so called universe like how time evolution is directly related with scalar field flow and what is the nature of time according to the nature of scalar fields? From my last five articles I am just skipping from above questions to answer but my each article had the scalar field as a major component of every single equation which was obtained in each article. I conjectured in my former article that each and every fundamental force can be generalized by some properties of the scalar fields of various kinds like universal scalar field (Φ_u), scalar field of broken parts (ϕ_b), scalar field around a perfect body (Φ_p), scalar field around an imperfect body (Φ_{im}) and the fundamental quantity of scalar fields (ϕ) (can be generalized as the generator of a particular scalar field).

Keywords: Central System Force, Central System Relativity, Dynamical Energy of Universe, Evolution Factor, Flow Function of Scalar Fields, Interacting Strength of Scalar Field Generators, Scalar Field Generators, Static Energy of Universe, Transformation Force, Universal Scalar Field, ϕ-series, ϕ-ψ transformation.

1. Introduction

At first I will start from the generators (ϕ) and intend to find out various functions of scalar fields of n-order. In the next phase of this article I tend to give justifications of the physical properties governed by these scalar field functions of n-order with generator (ϕ) and intend to justify the physical nature of these scalar fields. After completing the descriptions of the physical nature I will imply these scalar fields on n-bodies formed into the n-kind of inflations of universe and intend to find out the formation method of n-central systems. I also intend to satisfy my former equations in terms of these functions and to answer the question like what should be the function of scalar field governed by whole central system (Φ_c°), which includes perfect and imperfect both kind of bodies and what are the effects generated by the Φ_c°? After answering these queries I intend to describe the flow functions of universal and bodies scalar field ($Ƒ(\Phi_u)$ & $Ƒ(\phi_b)$) and how these govern dynamics of a particular body in universal frame of reference. Then I will describe the properties of these flow functions and effect on the motion of universe by $Ƒ(\Phi_u)$ or the universal time (τ). I also intend to justify the questions about energy and its interactions with scalar field and why integration with respect to $d\tau$ includes the flow function?

2. Physical significance of some mathematical outcomes

2.1. Integration with Respect to Time

I am starting with an integration method to which I have introduced in my article "Standard Definitions of the fundamental quantities exist in universe" [5] while doing the integration for action ($\boldsymbol{\mathcal{A}_t}$). Suppose $g(\tau)$ is a function of the universal time we are integrating it from τ_1 to τ_2 in universal frame of reference and obtain $G(\tau)$ as the integration as-

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$$\boldsymbol{G(\tau)} = \int_{\tau_1}^{\tau_2} \boldsymbol{g(\tau)\,.\,d\tau} \tag{1}$$

Now as we know from my former articles that τ is flow of universal scalar field (Φ_u) and we represent the flow function as $\mathcal{F}(\Phi_u)$. Now suppose a body in universal frame of reference with the above terms can be represented as-

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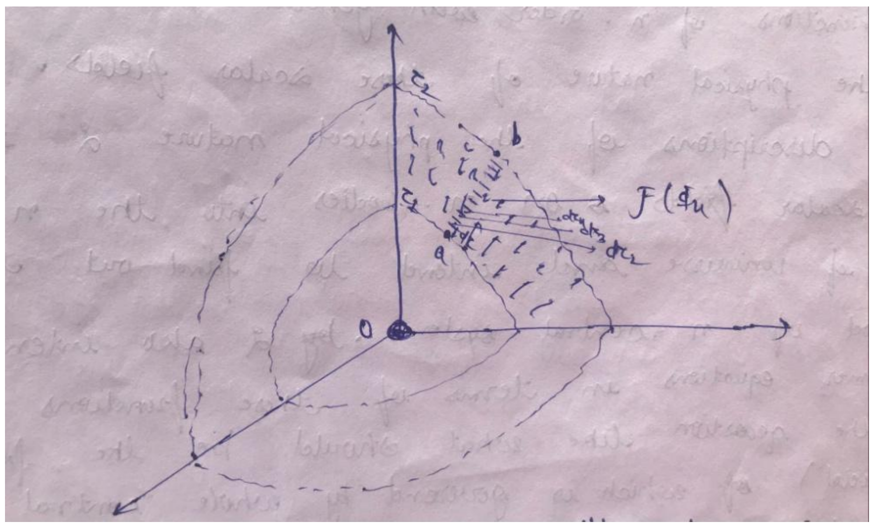


Fig. 1 - Change in Flow of Time between Two Universal Epochs picture

Now if all infinitesimal time differences are same, then-

$$d\tau_1 = d\tau_2 = d\tau_3 = \cdots = d\tau_n \neq d\tau \tag{2}$$

Here comes out a problem when the distances of measuring these time differences are not same in the frame of reference or we can generalize equation (2) as-

$$d\tau_1 = d\tau_2 = d\tau_3 = \cdots = d\tau_n = \zeta\big(\mathcal{F}(\Phi_u)\big).\,d\tau \tag{3}$$

Here ζ is a unitary function which determines the flow of time between infinitesimal time differences. So, we can write integration in equation (1) as-

$$\boldsymbol{G(\tau)} = \int_{\tau_1}^{\tau_2} \boldsymbol{g(\tau)\,.\,\zeta\big(\mathcal{F}(\Phi_u)\big).\,d\tau} \tag{4}$$

Or

$$\left|\zeta\big(\mathcal{F}(\Phi_u)\big)\right| \to 1$$

So, each and every time integral must contain the function $\zeta\big(\mathcal{F}(\Phi_u)\big)$ in universal frame of reference. As I defined ζ as a unitary function which also vary between the co-domain $\{1^-,1^+\}$ and a function of the flow function.

Now I intend to justify some former mathematical facts about the various scalar fields in physical sense. As I described in my last paper [5] the scalar fields have a generator (ϕ) and have some particular order of itself in generator. Let Φ be the scalar field of order-n with generator ϕ, then Φ can be defined in universal sense in form of ϕ-series of n-order as-

$$\Phi = (\phi;\phi)_n = (1-\phi)(1-\phi^2)(1-\phi^3)\ldots(1-\phi^n) \tag{5}$$

Or another kind of n-order ϕ-series as-

$$\Phi = (a; b\phi)_n \tag{6}$$

Here $\phi = \phi_1 + i\phi_2$

Now one question must be in your curious mind that why we need the n-order ϕ-series to represent scalar fields and how these only have these formed out by one kind of Generator (ϕ)? So, the answer to this question leads us to another question that how scalar fields forms in universe? Here I am representing

the formation technique of scalar fields in universe by the n-time inflationary model of universe diagram-
fields in universe by the n-time inflationary model of universe diagram-

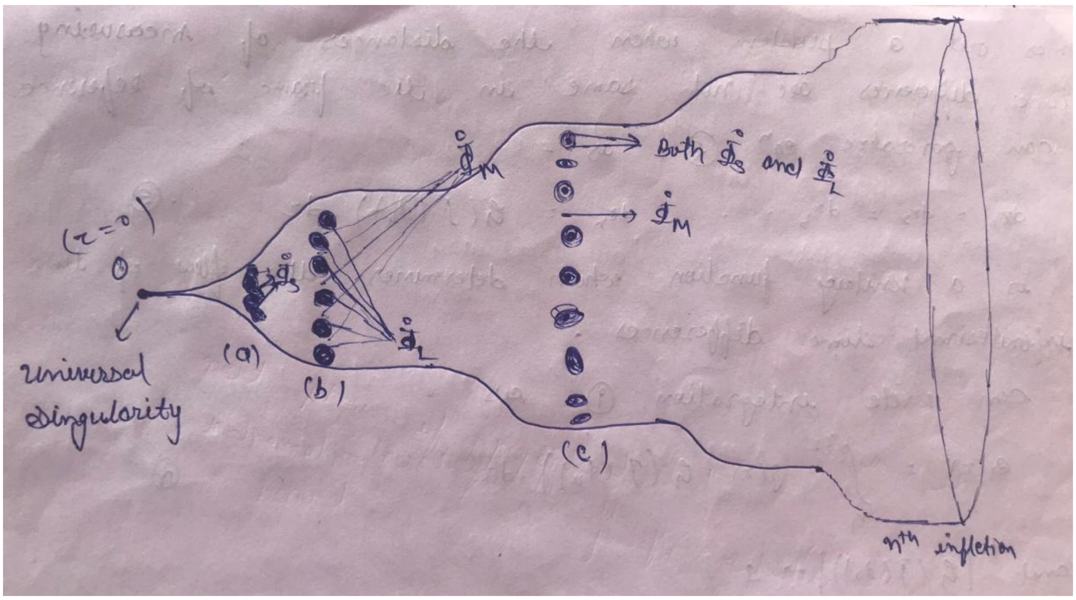


Fig. 2 - Formation Technique of scalar fields in Universe

Now start by thinking about the universal singularity at point 'O' or $\tau = 0$ and the nature of universal singularity form where all creation started. There must be a unique quantity like physical entity and the surrounding physical entity which govern flow on the behalf of that unique quantity (Ψ_u°). So, we can represent the origin of universe in form of contribution of these two quantities Ψ_u° and Φ_u° as-

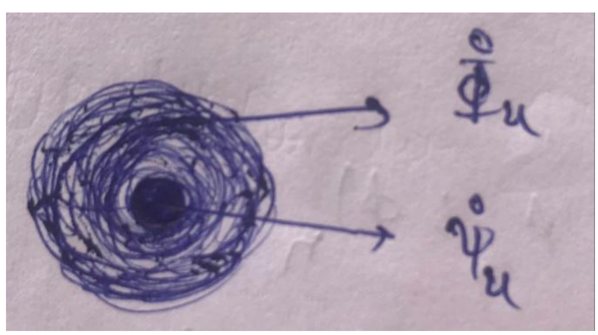


Fig. 3 - Initial Formations in Universe

So, there were something at the origin which was responsible for the all creation or in simple words "Universe is not created form nothing". Now the interesting facts come out that how universal singularity creates everything? What was the order of creation or how the physical law's we see at this epoch are relevant to the creation epoch? The answer of these fundamental queries lies in the nature of these two functions Ψ_u° and Φ_u° . Nature of the function Φ_u° is hidden into its definition that it must contain all type of scalar fields in universe because all type of scalar fields exist in universe are created from Φ_u°. In similar way all type of bodies contain some fundamental parts of the Ψ_u° and Φ_u° or in other words we can represent all bodies as some combination of the generators of both Ψ_u° and Φ_u°. So, Φ_u° is a kind of function which must contain all type of generators. There must be also an equation in form of Ψ_u° and Φ_u° which defines all creation. By not considering the equation here only I intend to find out scalar field functions.

2.2. Scalar Field Generators

There must exist two types of generators according to n-time inflationary model of universe. First kind of them must be responsible for the formation of repulsing bodies and another one should be responsible for the formation of stable or attractive bodies (which forms central systems). So, two kinds of functions of generators must be needed for defining scalar fields exist in universe.

As I described in my former article [5] about scalar field functions, here I am starting with that terminology-

$$\phi = \phi_1 + i\phi_2$$

This is the first kind of generators (Responsible for formation of repulsive bodies). Now by taking complex conjugate of the first kind of generators, we get second kind of generators as-

$$\phi^\dagger = \phi_1 - i\phi_2$$

This can be generalized as the generator which is responsible for the formation of stable or attractive bodies. As I considered before that Φ_u° contains all kind of generators then we can represent Φ_u° as a function of these two types of generators as-

$$\Phi_u^\circ(\phi, \phi^\dagger) \tag{7}$$

Now the question comes out about the order of Φ_u°. As by formation ability of universe Φ_u° should be of infinite order. So, the ϕ-series representation of Φ_u° will be some combination of infinite ordered ϕ-series of two type of generators, as-

$$\Phi_u^\circ = \sum_{n=0}^{\infty} (\phi;\phi)_n (\phi^\dagger;\phi^\dagger)_n (-\phi;\phi)_n (-\phi^\dagger;\phi^\dagger)_n \tag{8}$$

Here $|\phi| = |\phi^\dagger| < 1$ or $|\phi| \in (0,1)$.

We can represent it in many other ϕ-series by some theorems by S. Ramanujana.

As we know the multiplication of these two kind of generators-

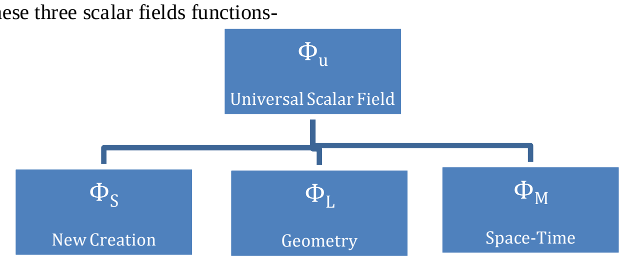
$$\phi\phi^\dagger = \phi_1^2 + \phi_2^2 = |\phi|^2 = |\phi^\dagger|^2 \tag{9}$$

Mathematics behind these functions will be described later in the next phase of paper. Now I intend to justify situation (a) in the formation model of universe. We can clearly observe from the diagram '2' that at situation (a) the scalar fields are mixed with some broken parts of Ψ_u° are manipulating these. We can obtain this situation at any epoch of first inflation but after the inflation epoch or in situation (b) form the same diagram the scalar fields are totally separated with geometries (G°).

2.3. Three Major Universal Scalar Fields

So, as I justified at the end of my second article [2] ("Generalization of Different Type of Bodies Exist in Universe") that the universe's initial function of all scalar fields (Φ_u°) can be separated in three parts as- first which is responsible for new creation (Φ_S°), second which is responsible for shaping the Geometries and leaving around Geometries (Φ_L°) and the last one which is itself spacetime and responsible for the dynamics of bodies (Φ_M°). So, I am representing the separation of scalar fields with universal tree diagram-

Now I am defining the features of these three scalar fields functions-



i. New Creation(Φ_S°)-

This function creates new bodies from older bodies in universe by ϕ-ψ transformation. So, in broken parts of all kind of bodies will be a part of Φ_S° like in gamma radiation. This function also plays a vital role during the inflations of universe because during the inflations there is huge ϕ-ψ mixing occurs and creates some new bodies.

ii. Geometry(Φ_L°)-

This function governs the properties of keeping universe alive with the surrounding scalar fields around various bodies. This function is also responsible for the stability of central systems in universe by providing variation into itself (or Curvature in Spacetime) and this is the generator of various forces in universe.

iii. Space-Time(Φ_M°)-

Apart from both above functions this scalar field govern the dynamics of universe and also responsible for the flow of time (τ) in universe. This function is a huge part of the origin of universe and responsible for the universal motion ($\vec{F}_{uni}$) in all bodies exist in universe (From my former article [5]). This function also plays a vital role in the inflations and Deflation or expansion and contraction of universe.

As I cleared first that these functions (Φ_S°, Φ_L° & Φ_M°) are some part of Φ_u° and we know from equation (8), that-

$$\Phi_u^\circ = \sum_{n=0}^{\infty} (\phi;\phi)_n (\phi^\dagger;\phi^\dagger)_n (-\phi;\phi)_n (-\phi^\dagger;\phi^\dagger)_n$$

The function is also valid in interval $n \in (-\infty,\infty)$ and can be written more precisely as-

$$\Phi_u^\circ = \sum_{n=-\infty}^{\infty} (\phi;\phi)_n(\phi^\dagger;\phi^\dagger)_n(-\phi;\phi)_n(-\phi^\dagger;\phi^\dagger)_n \tag{10}$$

We can write the above described three functions as-

$$\Phi_S^\circ + \Phi_L^\circ + \Phi_M^\circ = \sum_{n=-\infty}^{\infty} (\phi;\phi)_n(\phi^\dagger;\phi^\dagger)_n(-\phi;\phi)_n(-\phi^\dagger;\phi^\dagger)_n \tag{11}$$

This seems complicated to define from the series here that which part of ϕ-series belongs to a particular function. Now I intend to justify the fact used by me in my former five articles that time is flow of universal scalar field in physical sense and later in mathematical sense. I am starting with a geometrical representation of a body from its creation and evolution with scalar field as-

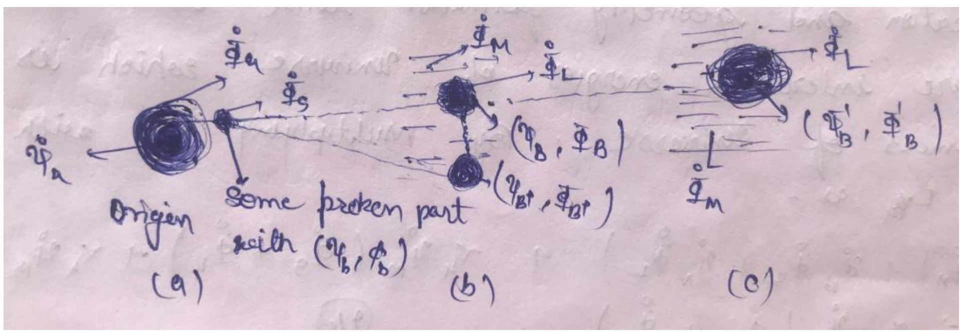


Fig. 4 - Creation and Evolution of a Body with Scalar Field

It is clearly visible from the situations (a), (b), & (c) that there are three type of scalar fields which plays a vital role in formation and evolution of a particular body. We can justify from situation (a) that if some parts breaks from the origin of universe that can become a massive body after some epoch by the help of three kinds of scalar fields. First in situation (a) Φ_S° plays a vital role in evolution of the broken part from B to $B^\dagger$. These two bodies are connected by universal connections (U_c). Now we can conclude the fact from both bodies that "Time is the flow of universal scalar field Φ_u° and it is manipulated by the quantities Ψ_u° in universe".

2.4. Universal Energies (Static and Dynamical)

Now I am calculating energies of universe in terms of these fundamental functions. As we know from my former article [5]-

$$E_\phi = \frac{\phi\psi}{\alpha} = \phi'\phi \, , E_\psi = \alpha\phi\psi = \psi'\psi \, , E = \phi\psi$$

In similar way by replacing above parameters with universal parameters as-

$$E_{\phi_u} = \frac{\Psi_u^\circ \Phi_u^\circ}{\alpha_u} \, , E_{\psi_u} = \alpha_u \Psi_u^\circ \Phi_u^\circ \, , E_u = \Psi_u^\circ \Phi_u^\circ \tag{12}$$

Now as we know both functions can be written in terms of three functions as-

$$\Psi_u^\circ = \Psi_B^\circ + \Psi_V^\circ + \Psi_M^\circ \tag{13}$$

$$\Phi_u^\circ = \Phi_S^\circ + \Phi_L^\circ + \Phi_M^\circ \tag{14}$$

So, universal energy can be written as-

$$E_u = \Psi_u^\circ \Phi_u^\circ = (\Psi_B^\circ + \Psi_V^\circ + \Psi_M^\circ).(\Phi_S^\circ + \Phi_L^\circ + \Phi_M^\circ) \tag{15}$$

$$\Rightarrow E_u = (\Psi_B^\circ \Phi_S^\circ + \Psi_V^\circ \Phi_L^\circ + \Psi_M^\circ \Phi_M^\circ) + \Psi_M^\circ(\Phi_S^\circ + \Phi_L^\circ) + \Psi_B^\circ(\Phi_L^\circ + \Phi_M^\circ) + \Psi_V^\circ(\Phi_S^\circ + \Phi_M^\circ) \tag{16}$$

Here first three terms are corresponding energies of each space-time, creation and geometry formation and the other terms in equation (16) are interaction energies of universe which are responsible for dynamics of universe. Now by multiplying E_u with α_u, we find out E_{ψ_u} as-

$$E_{\psi_u} = \alpha_u(\Psi_B^\circ \Phi_S^\circ + \Psi_V^\circ \Phi_L^\circ + \Psi_M^\circ \Phi_M^\circ) + \alpha_u\Psi_M^\circ(\Phi_S^\circ + \Phi_L^\circ) + \alpha_u\Psi_B^\circ(\Phi_L^\circ + \Phi_M^\circ) + \alpha_u\Psi_V^\circ(\Phi_S^\circ + \Phi_M^\circ) \tag{17}$$

Or in the same way by dividing E_u with α_u, we get E_{ϕ_u} as-

$$E_{\phi_u} = \frac{1}{\alpha_u}(\Psi_B^\circ \Phi_S^\circ + \Psi_V^\circ \Phi_L^\circ + \Psi_M^\circ \Phi_M^\circ) + \frac{\Psi_M^\circ}{\alpha_u}(\Phi_S^\circ + \Phi_L^\circ) + \frac{\Psi_B^\circ}{\alpha_u}(\Phi_L^\circ + \Phi_M^\circ) + \frac{\Psi_V^\circ}{\alpha_u}(\Phi_S^\circ + \Phi_M^\circ) \tag{18}$$

We can also represent these things in complementary forms by putting $\alpha\phi = \psi'$ or $\phi' = \frac{\psi}{\alpha}$ as-

$$E_{\psi_u} = (\Psi_B^{\circ}\Psi_B^{\circ'} + \Psi_V^{\circ}\Psi_V^{\circ'} + \Psi_M^{\circ}\Psi_M^{\circ'}) + \Psi_M^{\circ}(\Psi_B^{\circ'} + \Psi_V^{\circ'}) + \Psi_B^{\circ}(\Psi_V^{\circ'} + \Psi_M^{\circ'}) + \Psi_V^{\circ}(\Psi_B^{\circ'} + \Psi_M^{\circ'}) \quad (19)$$

$$E_{\phi_u} = (\Phi_S^{\circ}\Phi_S^{\circ'} + \Phi_L^{\circ}\Phi_L^{\circ'} + \Phi_M^{\circ}\Phi_M^{\circ'}) + \Phi_M^{\circ'}(\Phi_S^{\circ} + \Phi_L^{\circ}) + \Phi_S^{\circ'}(\Phi_L^{\circ} + \Phi_M^{\circ}) + \Phi_L^{\circ'}(\Phi_S^{\circ} + \Phi_M^{\circ}) \quad (20)$$

Here we have used $\Psi_B^{\circ'} = \alpha_u\Phi_S^{\circ}, \Psi_V^{\circ'} = \alpha_u\Phi_L^{\circ}, \Psi_M^{\circ'} = \alpha_u\Phi_M^{\circ}$ or $\frac{\Psi_M^{\circ}}{\alpha_u} = \Phi_M^{\circ'}, \frac{\Psi_B^{\circ}}{\alpha_u} = \Phi_S^{\circ'}, \frac{\Psi_V^{\circ}}{\alpha_u} = \Phi_L^{\circ'}$.

So, form here now we can generalize universal energy in two forms, as-

$$E_u = E_s + E_{int} \quad (21)$$

$$Here \begin{cases} E_s = Static\ Energy\ of\ Universe \\ (Usually\ Non-Transformable) \\ E_{int} = Interacting\ or\ Dynamical\ Energy \\ of\ Universe\ (Usually\ Transformable) \end{cases}$$

$$E_s = \Psi_B^{\circ}\Phi_S^{\circ} + \Psi_V^{\circ}\Phi_L^{\circ} + \Psi_M^{\circ}\Phi_M^{\circ} \quad (22)$$

$$E_{int} = \Psi_M^{\circ}(\Phi_S^{\circ} + \Phi_L^{\circ}) + \Psi_B^{\circ}(\Phi_L^{\circ} + \Phi_M^{\circ}) + \Psi_V^{\circ}(\Phi_S^{\circ} + \Phi_M^{\circ}) \quad (23)$$

Now as we come to our former description of formation of scalar fields with the help of the universal diagram, then we conclude some facts about the generators of $\Phi_S^{\circ}, \Phi_L^{\circ}$ and Φ_M° like Φ_M° must contain non-interacting terms in equation (11) or Φ_L° must contain moderately interacting terms and Φ_S° must contain high level of interacting terms. So, Φ_M° should contain odd type of generators like $\phi\phi^{\dagger}\phi$, ϕ , $\phi\phi\phi$, $\phi^{\dagger}\phi^{\dagger}\phi^{\dagger}$ etc. or Φ_L° should contain the generators like $\phi\phi\phi\phi^{\dagger}$, $\phi\phi^{\dagger}$, $\phi\phi^{\dagger}\phi\phi^{\dagger}$ etc. or Φ_S° should contain the generators like $\phi^2, \phi^4, {\phi^{\dagger}}^2, {\phi^{\dagger}}^4$ etc. So, we can easily identify three separate terms in Φ_u° (Scalar field function of universe). Now let's come to another point which is very important to be cleared that there is a difference between Φ_u° and Φ_u .

$$\Phi_u = \Phi_u^{\circ} - \sum_{n\in\mathbb{R}}\Phi_B \quad (24)$$

Here Φ_B is a scalar field of a body and summed up to all bodies exist in universe. So, the fact behind the motion by universe in a body is by Φ_u not by Φ_u° as defined in my former paper.

2.5. Universal Quantities of Motion (Momentum in Modern Sense)

In my former paper on definitions of all quantities I have defined an equation as-

$$\vec{F}_{total} = \vec{F}_{act.} + \vec{F}_{uni.}$$

$$\because \vec{F}_{uni.} = \psi\frac{\partial\Phi_u}{\partial\tau}\hat{F}_{uni.}$$

Now by replacing Φ_u in above equation by equation (24), we get-

$$|\vec{F}_{uni.}| = \psi\frac{\partial\Phi_u}{\partial\tau} = \psi\frac{\partial(\Phi_u^{\circ} - \sum_{n\in\mathbb{R}}\Phi_B)}{\partial\tau} \quad (25)$$

Or

$$F_{uni.} = \psi\frac{\partial\Phi_u^{\circ}}{\partial\tau} - \psi\sum_{n\in\mathbb{R}}\frac{\partial\Phi_B}{\partial\tau} \quad (26)$$

Here first term $\psi\frac{\partial\Phi_u^{\circ}}{\partial\tau}$ defines motion of universe with respect to body and second term $\psi\sum_{n\in\mathbb{R}}\frac{\partial\Phi_B}{\partial\tau}$ defines motion of bodies in universe with respect to body for which we are calculating it. So, we can also write motion due to universe in a body as two components, as-

$$\vec{F}_{uni.} = \vec{F}_{(uni.)b} - \vec{F}_{(Bodies)b} \quad (27)$$

Now by putting equation (27) in $\vec{F}_{total}$ we get-

$$\boxed{\vec{\boldsymbol{F}}_{\boldsymbol{total}} = \vec{\boldsymbol{F}}_{\boldsymbol{act.}} + \vec{\boldsymbol{F}}_{\boldsymbol{(uni.)b}} - \vec{\boldsymbol{F}}_{\boldsymbol{(Bodies)b}}} \quad (28)$$

Now by conservation of total energy in universe-

$$\frac{\partial E_u}{\partial\tau} = 0 \quad (29)$$

Now by putting the value of E_u from equation (16), we get-

$$\Psi_B^{\circ}\frac{\partial\Phi_S^{\circ}}{\partial\tau} + \Phi_S^{\circ}\frac{\partial\Psi_B^{\circ}}{\partial\tau} + \Psi_V^{\circ}\frac{\partial\Phi_L^{\circ}}{\partial\tau} + \Psi_M^{\circ}\frac{\partial\Phi_M^{\circ}}{\partial\tau} + \Phi_L^{\circ}\frac{\partial\Psi_V^{\circ}}{\partial\tau} + \Phi_M^{\circ}\frac{\partial\Psi_M^{\circ}}{\partial\tau} + \frac{\partial\Psi_M^{\circ}}{\partial\tau}(\Phi_S^{\circ} + \Phi_L^{\circ}) + \frac{\partial\Psi_B^{\circ}}{\partial\tau}(\Phi_L^{\circ} + \Phi_M^{\circ}) + \frac{\partial\Psi_V^{\circ}}{\partial\tau}(\Phi_S^{\circ} + \Phi_M^{\circ}) + \Psi_B^{\circ}\left(\frac{\partial\Phi_L^{\circ}}{\partial\tau} + \frac{\partial\Phi_M^{\circ}}{\partial\tau}\right) + \Psi_V^{\circ}\left(\frac{\partial\Phi_S^{\circ}}{\partial\tau} + \frac{\partial\Phi_M^{\circ}}{\partial\tau}\right) + \Psi_M^{\circ}\left(\frac{\partial\Phi_L^{\circ}}{\partial\tau} + \frac{\partial\Phi_S^{\circ}}{\partial\tau}\right) = 0$$

(30)

Now we can generalize three fundamental terms in equation (30), as-

$$F_{space-time} = \Psi_M^{\circ} \frac{\partial \Phi_M^{\circ}}{\partial \tau}, F_{creation} = \Psi_B^{\circ} \frac{\partial \Phi_S^{\circ}}{\partial \tau}, F_{Geometrical} = \Psi_V^{\circ} \frac{\partial \Phi_L^{\circ}}{\partial \tau} \tag{31}$$

So, by putting these three terms in equation (31), we get by taking these three terms to left hand side and other three terms to R.H.S.-

$$-(F_{space-time} + F_{creation} + F_{Geometrical}) = \Phi_S^{\circ} \frac{\partial \Psi_B^{\circ}}{\partial \tau} + \Phi_L^{\circ} \frac{\partial \Psi_V^{\circ}}{\partial \tau} + \Phi_M^{\circ} \frac{\partial \Psi_M^{\circ}}{\partial \tau} + \frac{\partial \Psi_M^{\circ}}{\partial \tau}(\Phi_S^{\circ} + \Phi_L^{\circ}) + \frac{\partial \Psi_B^{\circ}}{\partial \tau}(\Phi_L^{\circ} + \Phi_M^{\circ}) + \frac{\partial \Psi_V^{\circ}}{\partial \tau}(\Phi_S^{\circ} + \Phi_M^{\circ}) + F_{interactions} \tag{32}$$

Here

$$F_{interactions} = \Psi_B^{\circ}\left(\frac{\partial \Phi_L^{\circ}}{\partial \tau} + \frac{\partial \Phi_M^{\circ}}{\partial \tau}\right) + \Psi_V^{\circ}\left(\frac{\partial \Phi_S^{\circ}}{\partial \tau} + \frac{\partial \Phi_M^{\circ}}{\partial \tau}\right) + \Psi_M^{\circ}\left(\frac{\partial \Phi_L^{\circ}}{\partial \tau} + \frac{\partial \Phi_S^{\circ}}{\partial \tau}\right) \tag{33}$$

All other terms in equation (32) are transformation terms. So, universe keep itself into motion by transformations ($\phi - \psi$ transformations, transformation of spin etc.). Now by rearranging and putting F_u (motion of Universe) as-

$$F_u = F_{space-time} + F_{creation} + F_{Geometrical} + F_{interactions} \tag{34}$$

$$\boxed{-F_u = transformations\ in\ universe} \tag{35}$$

Or by equation (32) we can write above equation as-

$$F_u = -\Phi_S^{\circ} \frac{\partial \Psi_B^{\circ}}{\partial \tau} - \Phi_L^{\circ} \frac{\partial \Psi_V^{\circ}}{\partial \tau} - \Phi_M^{\circ} \frac{\partial \Psi_M^{\circ}}{\partial \tau} - \frac{\partial \Psi_M^{\circ}}{\partial \tau}(\Phi_S^{\circ} + \Phi_L^{\circ}) - \frac{\partial \Psi_B^{\circ}}{\partial \tau}(\Phi_L^{\circ} + \Phi_M^{\circ}) - \frac{\partial \Psi_V^{\circ}}{\partial \tau}(\Phi_S^{\circ} + \Phi_M^{\circ}) \tag{36}$$

Now the universal diagram of formation of scalar fields is becoming clearer to understand by these equations. After some epoch let's say 'a' the fundamental scalar field function of universe (Φ_u°) separated into three major parts ($\Phi_S^{\circ}, \Phi_L^{\circ}$ and Φ_M°). Now we can distribute all type of scalar fields in universe into these major parts with their generators or in other words we can justify a scalar field function in form of generators of these three functions.

2.6. Scalar Field Density and Energy Density

Now if we intend to calculate the densities of these scalar fields, then we should use the infinitesimal volume element ($\boldsymbol{\mathcal{V}}$) which depends on the type of geometries in which we are calculating it. So-

$$\rho_\phi = \frac{\Phi}{\boldsymbol{\mathcal{V}}} \tag{37}$$

For an n-dimensional manifold ($\boldsymbol{\mathcal{M}}$) can volume element $\boldsymbol{\mathcal{V}}$ be defined by some mathematical manipulations. If a n-dimensional manifold ($\boldsymbol{\mathcal{M}}$) with geometry $G°$ can be defined as $\boldsymbol{\mathcal{M}}^{\mathrm{n}}(G°)$, then the volume element of it can be defined as-

$$\mathcal{V}(\boldsymbol{\mathcal{M}}^{\mathrm{n}}(G°)) \tag{38}$$

Now by merging equation (37) with equation (38), we get-

$$\rho_\phi = \frac{\Phi}{\mathcal{V}(\boldsymbol{\mathcal{M}}^{\mathrm{n}}(G°))} \tag{39}$$

Now as we know scalar fields have generators ($\phi, \phi^\dagger$), so-

$$\rho_\phi = \frac{\Phi(\phi, \phi^\dagger)}{\mathcal{V}(\boldsymbol{\mathcal{M}}^{\mathrm{n}}(G°))} \tag{40}$$

So, we can define scalar field density in form of equation (40). Now we can also calculate energy density in form of scalar field density, as-

$$\mathcal{E} = \frac{E}{\mathcal{V}(\boldsymbol{\mathcal{M}}^{\mathrm{n}}(G°))} = \frac{\psi\Phi}{\mathcal{V}(\boldsymbol{\mathcal{M}}^{\mathrm{n}}(G°))} \tag{41}$$

Or by solving further-

$$\boxed{\boldsymbol{\mathcal{E} = \psi\rho_\phi}} \tag{42}$$

Here $\mathcal{E}$= energy per unit volume

Now we can also calculate two other forms of energy, as-

$$\mathcal{E}_\phi = \frac{\psi\rho_\phi}{\alpha} \tag{43}$$

Or

$$\mathcal{E}_{\psi} = \alpha\psi\rho_{\phi} \tag{44}$$

Now from our former analysis, if-

$$\frac{\partial\rho_{\phi}}{\partial x} \neq 0 \tag{45}$$

Here x is some space parameter

Then there must exist Gravitation like force in universe because gravity is due to variation into scalar field density from my former articles or in another form we can express in central systems there must exist-

$$\boxed{\Delta\boldsymbol{\rho_{\phi}} \neq \mathbf{0}} \tag{46}$$

Now by calculating variation into equation (42) as-

$$\Delta\mathcal{E} = \Delta\psi\rho_{\phi} + \psi\Delta\rho_{\phi} \tag{47}$$

For infinitesimal variation we can write Δ as d, we get above equation as-

$$d\mathcal{E} = d\psi\rho_{\phi} + \psi d\rho_{\phi} \tag{48}$$

As we know total energy of a system is conserved, then-

$$d\mathcal{E} = 0 \tag{49}$$

Now by putting equation (49) into (48), we get-

$$d\psi\rho_{\phi} = -\psi d\rho_{\phi} \tag{50}$$

Now by some manipulations in above equation, we get-

$$\frac{1}{\rho_{\phi}} d\rho_{\phi} = -\frac{1}{\psi} d\psi \tag{51}$$

Now by integrating both sides-

$$\int \frac{1}{\rho_{\phi}} d\rho_{\phi} = -\int \frac{1}{\psi} d\psi + C \tag{52}$$

{Here C is integration constant}

Now by solving above integrations, we get-

$$\log\rho_{\phi} = -\log\psi + C \tag{53}$$

Or we can write it as (taking natural logarithm)-

$$\ln\rho_{\phi} = \ln\frac{1}{\psi} + \ln k \tag{54}$$

Here $C = \ln k$

Now by taking antilogarithm, we get-

$$\rho_{\phi} = e^{\ln\frac{k}{\psi}} \tag{55}$$

Or

$$\rho_{\phi} = \frac{k}{\psi} \tag{56}$$

So here $k = \mathcal{E} = e^{C}$

We can also get two outstanding derivatives from equation (50), as-

$$\frac{d\rho_{\phi}}{d\psi} = -\frac{\rho_{\phi}}{\psi} \tag{56}$$

Or converse of it-

$$\frac{d\psi}{d\rho_{\phi}} = -\frac{\psi}{\rho_{\phi}} \tag{57}$$

Now by calculating $\frac{d\rho_{\phi}}{d\psi}$ value form equation (40), we get-

$$\frac{d\rho_\phi}{d\psi}=\frac{\frac{\partial\Phi(\phi,\phi^\dagger)}{\partial\psi}\mathcal{V}\big(\boldsymbol{\mathcal{M}}^{\mathrm{n}}(G^\circ)\big)-\Phi(\phi,\phi^\dagger)\frac{\partial\mathcal{V}(\boldsymbol{\mathcal{M}}^{\mathrm{n}}(G^\circ))}{\partial\psi}}{\mathcal{V}^2\big(\boldsymbol{\mathcal{M}}^{\mathrm{n}}(G^\circ)\big)} \tag{58}$$

Now by putting

$$\rho_\psi=\frac{\psi}{\mathcal{V}\big(\boldsymbol{\mathcal{M}}^{\mathrm{n}}(G^\circ)\big)}=\frac{\partial\psi}{\partial\mathcal{V}\big(\boldsymbol{\mathcal{M}}^{\mathrm{n}}(G^\circ)\big)} \tag{59}$$

Now by putting $\frac{\partial\mathcal{V}(\boldsymbol{\mathcal{M}}^{\mathrm{n}}(G^\circ))}{\partial\psi}=\frac{1}{\rho_\psi}$ and putting equation (56) = (58), we get-

$$\frac{\partial\Phi(\phi,\phi^\dagger)}{\partial\psi}\frac{1}{\mathcal{V}\big(\boldsymbol{\mathcal{M}}^{\mathrm{n}}(G^\circ)\big)}-\frac{1}{\rho_\psi}\rho_\phi\frac{1}{\mathcal{V}\big(\boldsymbol{\mathcal{M}}^{\mathrm{n}}(G^\circ)\big)}=-\frac{\rho_\phi}{\psi} \tag{60}$$

Now by multiplying both sides in equation (60) by $\mathcal{V}\big(\boldsymbol{\mathcal{M}}^{\mathrm{n}}(G^\circ)\big)$, we get-

$$\frac{\partial\Phi(\phi,\phi^\dagger)}{\partial\psi}=\frac{\rho_\phi}{\rho_\psi}-\frac{\Phi(\phi,\phi^\dagger)}{\psi} \tag{61}$$

Now by putting values of ρ_ϕ and ρ_ψ from equation (59) and (40), we get a beautiful relation as-

$$\frac{\partial\Phi(\phi,\phi^\dagger)}{\partial\psi}=\frac{\Phi(\phi,\phi^\dagger)}{\psi}-\frac{\Phi(\phi,\phi^\dagger)}{\psi}=0 \tag{62}$$

So, for any conserved energy system-

$$\frac{\partial\Phi(\phi,\phi^\dagger)}{\partial\psi}=0 \tag{63}$$

Or there is no $\phi-\psi$ transformation for any conserved energy system.

2.7. $\phi-\psi$ transformation and Stability of Central Systems

For $\phi-\psi$ transformation-

$$\Delta\psi=\alpha\Delta\Phi\ \Rightarrow\frac{1}{\alpha}=\frac{\Delta\Phi}{\Delta\psi}=\frac{\partial\Phi(\phi,\phi^\dagger)}{\partial\psi} \tag{64}$$

α is not finite , so there is no $\phi-\psi$ transformation in conserved energy system.

Now in similar way we can justify about the terms in equation (36) like $\frac{\partial\Psi_M^\circ}{\partial\tau}$ etc. are transformation terms, because-

$$d\tau=kd\Phi_u$$

And in $\phi-\psi$ transformation-

$$\Delta\psi=\alpha\Delta\Phi$$

So,

$$\frac{\partial\Psi_M^\circ}{\partial\tau}=\frac{\partial\Psi_M^\circ}{k\partial\Phi_u}=\frac{1}{k}\frac{\partial\Psi_M^\circ}{\partial\Phi_u}\ or\ \frac{\partial\Psi}{\partial\Phi}=\alpha \tag{65}$$

We can write above equation as-

$$\frac{\partial\Psi_M^\circ}{\partial\tau}=\frac{\alpha}{k} \tag{66}$$

Or by some manipulations in above equation, we get-

$$\partial\Psi_M^\circ=\alpha\frac{\partial\tau}{k} \tag{67}$$

Or we can write it as-

$$\partial\Psi_M^\circ=\alpha\partial\Phi_u \tag{68}$$

So, the terms with derivatives of quantities (Ψ) are transformation terms. So, "transformations keeps universe in Motion". Equation (50) also tells us about how bodies (stable) lives in the density variation systems-

$$\psi d\rho_\phi=-d\psi\rho_\phi$$

The first term is density variation and second term is $\phi-\psi$ transformation. We can understand the fact by geometrical significance of a central system and my former terms states also by this equation in conserved energy systems. So, the diagram for stability is here-

So, the diagram for stability is here-

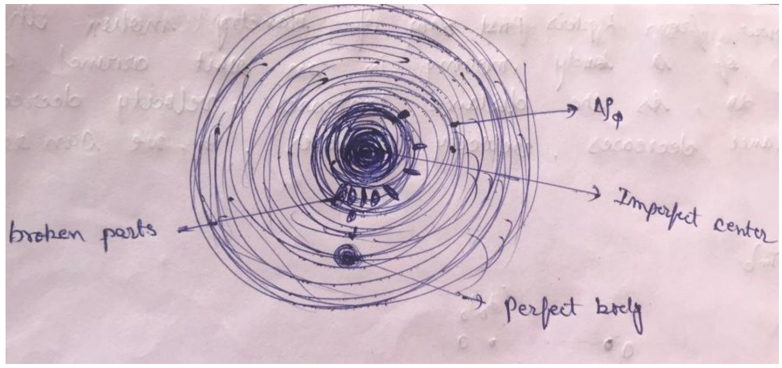


Fig. 5 - Stability in Conserved Energy System

If we have a closer look on the perfect body in above diagram, then-

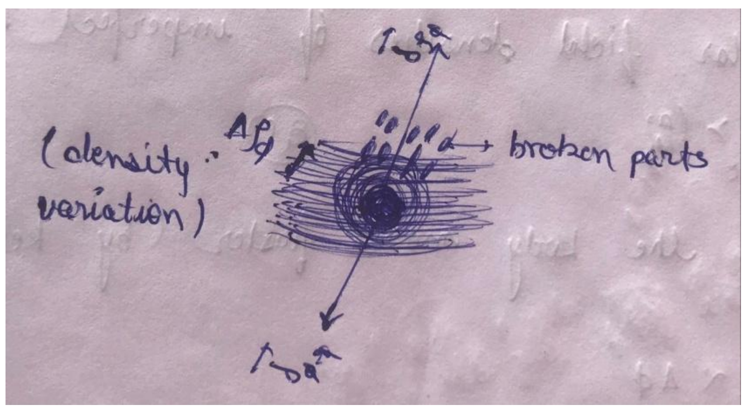


Fig. 6 – Stable Perfect Body in Central System

So, the transformation force keeps a perfect body in motion around the imperfect centre by balancing to the force due to density variation around imperfect body. Now one query must be hitting your mental lexicon that why a perfect body moving around an imperfect centre don't have any distortion while it is moving in a particular orbit and does it cause any distortion in particular body due to not moving in its orbit. Answer of this outstanding query lies in the above geometrical representation of stability. Weather I have described in my former article that when a body is moving in an orbit around an imperfect centre, then its path will be on a particular scalar field density (ρ_ϕ) variation due to imperfect center or in an orbit the coupling of scalar fields will be of same order for both bodies. Now one more question must be hitting your mental lexicon that what happens in elliptical orbits than? So, I am representing a body in elliptical orbit to answer both queries-

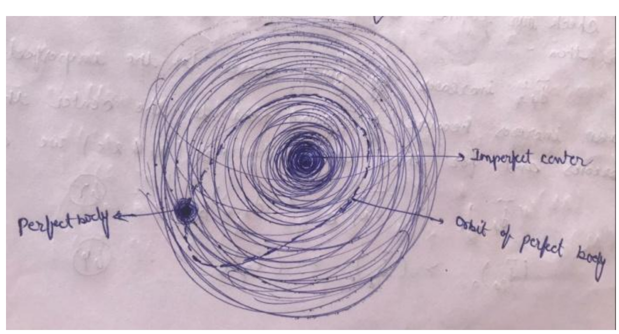


Fig. 7 –Formation and Stability of Elliptic Orbit

Now as we know from Kepler's First law [18] of planetary motion that angular momentum of a body moving in an orbit around a star will be conserved. So, as the distance increases, velocity decreases and as to distance decreases, velocity increases. So, we can represent the orbit as-

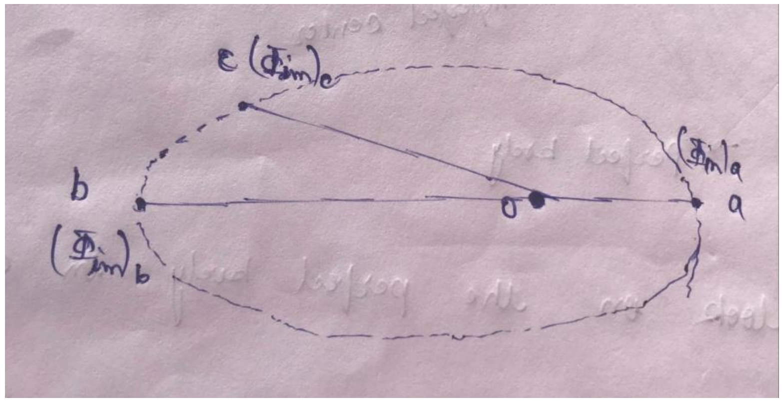


Fig. 8 –Scalar Fields in Elliptic Orbits in Different Situations

Here in three situations scalar field densities of imperfect body are like-

$$(\rho_\phi)_a > (\rho_\phi)_c > (\rho_\phi)_b \tag{69}$$

And as the ρ_ϕ increases, the body moves faster (by Kepler's Law [18]). Now as we know from my former papers-

$$\psi = \psi_p + \alpha\Delta\phi$$

$$F = \psi.\frac{\partial\phi_{covered}}{\partial\tau}$$

Now for ϕ –ψ transformation $\Delta\psi = \alpha\Delta\phi$, so, we can write the quantity of a body as-

$$\psi = \psi_p + \Delta\psi \tag{70}$$

Now the quantity of motion in the above elliptic orbit can be defined as-

$$F_e = \psi_{per}.\frac{\partial(\Phi_{im})_{covered}}{\partial\tau} \tag{71}$$

Now by putting the value of quantity in equation (71), we get-

$$F_e = (\psi_p + \Delta\psi)_{per}.\frac{\partial(\Phi_{im})_{cover\,ed}}{\partial\tau} \tag{72}$$

As we know $\rho_\phi \propto \phi$, so, we can write equation (69) as-

$$(\Phi_{im})_a > (\Phi_{im})_c > (\Phi_{im})_b \tag{73}$$

Now if we check our former stability criteria of a body around an imperfect centre, then- as $\vec{\delta}_{\phi-\psi}$ increases by going nearer to the imperfect centre, then $\vec{\delta}_{\rho_\phi}$ also increases because by going near to the center the density variation increases and for these three situations (a, b & c), we can determine-

$$(\vec{\delta}_{\phi-\psi})_a > (\vec{\delta}_{\phi-\psi})_c > (\vec{\delta}_{\phi-\psi})_b \tag{74}$$

$$(\vec{\delta}_{\rho_\phi})_a > (\vec{\delta}_{\rho_\phi})_c > (\vec{\delta}_{\rho_\phi})_b \tag{75}$$

2.8. Central System Force

So, we can determine a beautiful aspect here, that the force δ_{ρ_ϕ} is proportional to coupling constant and variation into density of scalar field $\Delta\rho_\phi$ as-

$$\delta_{\rho_\phi} \propto \alpha(\Delta\rho_\phi)_{center} \tag{76}$$

Here α is the conversion or coupling constant of the body on which we are applying this force. From our former analysis we can also determine that δ_{ρ_ϕ} is also proportional to the quantity of the perfect body for which we are measuring it. So –

$$\delta_{\rho_\phi} \propto \psi_{per} \tag{77}$$

Now by combining both equations (76) and (77) by removing proportionality constant from the equation, we get-

$$\delta_{\rho_\phi} = k\alpha\psi_{per}(\Delta\rho_\phi)_{center} \tag{78}$$

We can also write it as-

$$\delta_{\rho_\phi} = k\alpha(\psi \mp \Delta\psi)_{per}(\Delta\rho_\phi)_{center} \tag{79}$$

Or in terms of $\alpha\Delta\phi$ also δ_{ρ_ϕ} can be written as-

$$\delta_{\rho_\phi} = k\alpha(\psi \mp \alpha\Delta\phi)_{per}\left(\Delta\rho_\phi\right)_{center} \tag{80}$$

For solar systems we can write k as G (Gravitational Constant) as-

$$\left(\delta_{\rho_\phi}\right)_{solar-system} = k\alpha(\psi \mp \alpha\Delta\phi)_{per}\left(\Delta\rho_\phi\right)_{im-center} \tag{81}$$

We can write $\left(\Delta\rho_\phi\right)_{im}$ from equation (40), as-

$$\left(\Delta\rho_\phi\right)_{im} = \Delta\left(\frac{\Phi_{im}(\phi,\phi^\dagger)}{\mathcal{V}(\boldsymbol{\mathcal{M}}^{\mathrm{n}}(G^\circ))}\right) \tag{82}$$

Now by putting equation (82) in (80), we get-

$$\delta_{\rho_\phi} = k\alpha(\psi \mp \alpha\Delta\phi)_{per}\Delta\left(\frac{\Phi_{im}(\phi,\phi^\dagger)}{\mathcal{V}(\boldsymbol{\mathcal{M}}^{\mathrm{n}}(G^\circ))}\right) \tag{83}$$

So, dependency of δ_{ρ_ϕ} on radius depends upon the dimensions of the central body or system.

Now as we know $-\delta = \alpha\frac{\Delta F}{\Delta\psi}$. So, change in motion of a body by variation in the scalar field density will be-

$$\Delta F_{\rho_\phi} = k\Delta\psi(\psi \mp \alpha\Delta\phi)_{per}\Delta\left(\frac{\Phi_{im}(\phi,\phi^\dagger)}{\mathcal{V}(\boldsymbol{\mathcal{M}}^{\mathrm{n}}(G^\circ))}\right) \tag{84}$$

Or

$$\Delta F_{\rho_\phi} = k\alpha\Delta\phi\,(\psi \mp \alpha\Delta\phi)_{per}\Delta\left(\frac{\Phi_{im}(\phi,\phi^\dagger)}{\mathcal{V}(\boldsymbol{\mathcal{M}}^{\mathrm{n}}(G^\circ))}\right) \tag{85}$$

Now by putting value of ΔF from my former article-

$$\left\{\because F = \left(\psi_p + \alpha\Delta\phi\right).\frac{\partial\phi_{covered}}{\partial\tau}\ or\ \phi_{covered} = s\right\}$$

$$\Delta F = \left(\Delta\psi_p + \Delta\alpha\Delta\phi + \alpha\Delta(\Delta\phi)\right).\frac{\partial s}{\partial\tau} + \left(\psi_p + \alpha\Delta\phi\right)\Delta\left(\frac{\partial s}{\partial\tau}\right) \tag{86}$$

Now by combining equations (85) and (86), we get-

$$\left(\Delta\psi_p + \Delta\alpha\Delta\phi + \alpha\Delta(\Delta\phi)\right).\frac{\partial s}{\partial\tau} + \left(\psi_p + \alpha\Delta\phi\right)\Delta\left(\frac{\partial s}{\partial\tau}\right) = k\alpha\Delta\phi\,(\psi \mp \alpha\Delta\phi)_{per}\Delta\left(\frac{\Phi_{im}(\phi,\phi^\dagger)}{\mathcal{V}(\boldsymbol{\mathcal{M}}^{\mathrm{n}}(G^\circ))}\right) \tag{87}$$

Now by dividing both sides by $\alpha\Delta\phi(\psi)_{per}$, we get-

$$\left(\frac{1}{\alpha\Delta\phi}\frac{\Delta\psi_p}{(\psi)_{per}} + \frac{1}{(\psi)_{per}}\frac{\Delta\alpha}{\alpha} + \frac{1}{(\psi)_{per}}\frac{\Delta(\Delta\phi)}{\Delta\phi}\right).\frac{\partial s}{\partial\tau} + \left(\frac{1}{\alpha\Delta\phi}\frac{\psi_p}{(\psi)_{per}} + \frac{1}{(\psi)_{per}}\right)\Delta\left(\frac{\partial s}{\partial\tau}\right) = k\left(1 \mp \frac{\alpha\Delta\phi}{\psi}\right)_{per}\Delta\left(\frac{\Phi_{im}(\phi,\phi^\dagger)}{\mathcal{V}(\boldsymbol{\mathcal{M}}^{\mathrm{n}}(G^\circ))}\right) \tag{88}$$

Now by putting $\Delta\left(\frac{\Phi_{im}(\phi,\phi^\dagger)}{\mathcal{V}(\boldsymbol{\mathcal{M}}^{\mathrm{n}}(G^\circ))}\right) = \left(\Delta\rho_\phi\right)_{im}$, then we get by dividing equation (88) by the same-

$$k = \frac{1}{\left(\Delta\rho_\phi\right)_{im}}\left\{\frac{1}{\alpha\Delta\phi}\frac{\Delta\psi_p}{(\psi)_{per}} + \frac{1}{(\psi)_{per}}\frac{\Delta\alpha}{\alpha} + \frac{1}{(\psi)_{per}}\frac{\Delta(\Delta\phi)}{\Delta\phi}\right\}.\frac{1}{\left(1 \mp \frac{\alpha\Delta\phi}{\psi}\right)_{per}}\frac{\partial s}{\partial\tau} + \frac{1}{\left(\Delta\rho_\phi\right)_{im}}\left\{\frac{1}{\alpha\Delta\phi}\frac{\psi_p}{(\psi)_{per}} + \frac{1}{(\psi)_{per}}\right\}\frac{1}{\left(1 \mp \frac{\alpha\Delta\phi}{\psi}\right)_{per}}\Delta\left(\frac{\partial s}{\partial\tau}\right) \tag{89}$$

Now we can determine that the value of k is very less in a particular central system because the value of variation constant (k) depends upon variations in perfection quantity of a perfect body ($\Delta\psi_p$), conversion constant variation ($\Delta\alpha$) and variation into the transformed scalar field ($\Delta(\Delta\phi)$) and these are so much less in measurement. So, gravity like forces which arise in universe by variation into the density of scalar fields has very weak constants with respect to other forces by different kind of interactions. Now we can also define gravitational like force in atomic central systems, as-

$$k_{atomic} = \frac{1}{\left(\Delta\rho_\phi\right)_{im}}\left\{\frac{1}{\alpha\Delta\phi}\frac{\Delta\psi_p}{(\psi)_{per}} + \frac{1}{(\psi)_{per}}\frac{\Delta\alpha}{\alpha} + \frac{1}{(\psi)_{per}}\frac{\Delta(\Delta\phi)}{\Delta\phi}\right\}.\frac{1}{\left(1 \mp \frac{\alpha\Delta\phi}{\psi}\right)_{per}}\frac{\partial s}{\partial\tau} + \frac{1}{\left(\Delta\rho_\phi\right)_{im}}\left\{\frac{1}{\alpha\Delta\phi}\frac{\psi_p}{(\psi)_{per}} + \frac{1}{(\psi)_{per}}\right\}\frac{1}{\left(1 \mp \frac{\alpha\Delta\phi}{\psi}\right)_{per}}\Delta\left(\frac{\partial s}{\partial\tau}\right) \tag{90}$$

Here ψ_p is the perfect mass of electron or $\left(\Delta\rho_\phi\right)_{im}$ is variation into the scalar field density of nucleus (which is imperfect body). In this way we can find out the fundamental forces (which require to stability and formation of a central system) for N-Central systems exist in universe. In this way we can unify all scale structures in universe and we can also unify General Relativity and Quantum Mechanics. So, "Universe governs same properties at different geometrical scales". In similar way we can find out variation constant for solar systems ($k_{solar-system}$) with the help of equation (89) or $k_{solar-system} \cong$ gravitational constant by Sir Isaac Newton as-

$$k_{solar-system} = \frac{1}{\left(\Delta\rho_\phi\right)_{im}}\left\{\frac{1}{\alpha\Delta\phi}\frac{\Delta\psi_p}{(\psi)_{per}} + \frac{1}{(\psi)_{per}}\frac{\Delta\alpha}{\alpha} + \frac{1}{(\psi)_{per}}\frac{\Delta(\Delta\phi)}{\Delta\phi}\right\}.\frac{1}{\left(1 \mp \frac{\alpha\Delta\phi}{\psi}\right)_{per}}\frac{\partial s}{\partial\tau} + \frac{1}{\left(\Delta\rho_\phi\right)_{im}}\left\{\frac{1}{\alpha\Delta\phi}\frac{\psi_p}{(\psi)_{per}} + \frac{1}{(\psi)_{per}}\right\}\frac{1}{\left(1 \mp \frac{\alpha\Delta\phi}{\psi}\right)_{per}}\Delta\left(\frac{\partial s}{\partial\tau}\right) \cong G \tag{91}$$

2.9. Central System Relativity

A special thing comes out to which I define as "Central System Relativity" and this govern the properties like "Laws of Physical Universe we define from a particular central system (k^{th}) with help of $(k-1)^{th}$ Broken parts depends upon or relatives with that central system we are observing the physical laws and straight forwardly these lows we observed depends on the geometrical scale difference of these central systems". This principle of "Central System Relativity" answers the queries by 100 years like why we cannot unify general relativity and quantum mechanics or why we can't unify all fundamental forces exist in universe. So, we can unify Quantum Mechanics and General Relativity in universal frame of reference which is uniformly used by me in my 5 former papers. We can also unify all fundamental forces exist in universe by using "central system relativity" and universal frame of reference. Now I am representing a diagram with help of universal frame of reference to explain "central system relativity"-

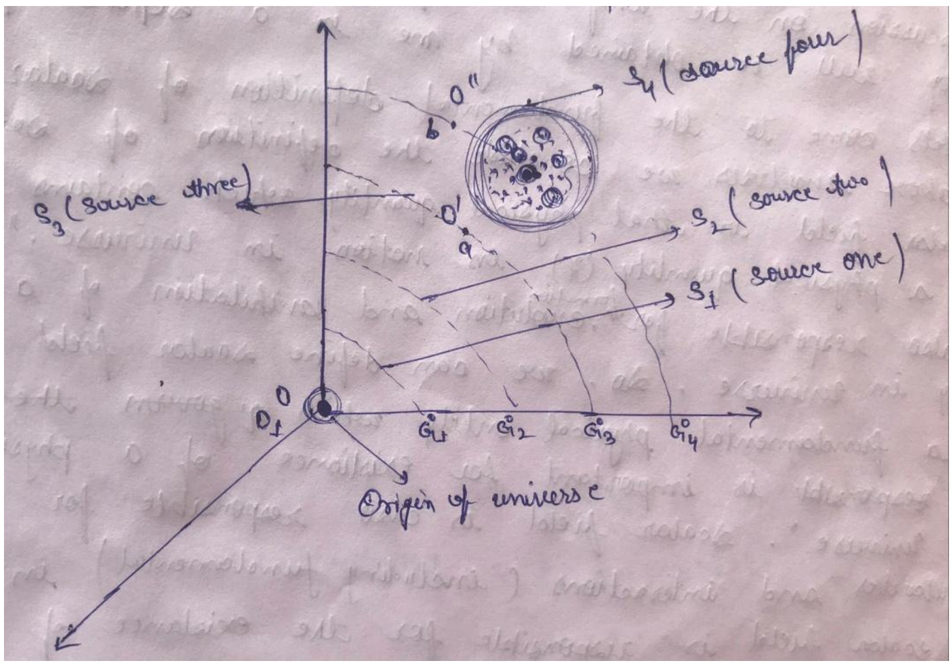


Fig. 9 –Observers in Principle of Central System Relativity

Now we can clearly see that there are four different geometrical scales and we define them as G_1°, G_2°, G_3°, G_4° and three observers from them one is at the origin of universal frame of reference (O_1) and other two are on respectively at a and be denoted O' and O''. Now what should be the definition of universal laws with respect to these three types of observers? Are these three observers define universe in different ways due to they are watching or observing the physical universe from different scales? The answer with help of central system relativity is yes. Observer at origin (O_1) will define the Laws of physics are same at all scales like universe is inflating in n-phases and the formation of central systems and forces governed by bodies at all geometrical scales are of same Type But the other two will observe the physical universe differently. Like O' observer at point (G_3°) Will define two kind of laws of physics one for bigger central systems or geometries (G_4°) And another for microscopic Geometries (G_2°) & (G_1°) end observer O'' At point b will define similar laws by looking at S_3, S_2, S_1 sources but the laws of physics observed for these three resources will seem different To observer O'' because he can't observe S_2 and S_1 sources with help of broken parts of S_3 (G_3°). So, O'' will see both uniform and discrete nature in the S_3 (G_3°) and will not see discrete nature in S_2 (G_2°) and S_1 (G_1°) or O'' will only observe uniform nature in G_2° and G_1° geometries. So, we see physical universe governed different laws on macroscopic scale (General Relativity) and on microscopic scale (Quantum Mechanics) because from our solar system perspective we are similar to observer O'. I will not obtain further justifications for the principle of "central system relativity" because the discussion on the unification of quantum mechanics and general relativity will be obtained by me in a separate paper.

Now let's come to the fundamental definition of scalar field. So, from all above analysis we conclude the definition of scalar field as "scalar field is that physical quantity which contains energy, space time and a physical quantity (ψ) in motion in universe". Scalar field is also responsible for formation evolution and annihilation of a particular physical entity in universe. So, we can define scalar field as "scalar field is a fundamental physical entity which is essential for existence of a physical quantity (ψ) in universe". Scalar field is also responsible for all type of Stabilities, singularities and interactions (Including fundamental) in universe. "Flow of scalar field is responsible for the existence of time in universe". Nature of scalar field defines properties of a physical quantity (ψ) like will it form a central system or is it not stable etc. Density variation of scalar field defines stability of central systems in universe and formation of stable central systems in universe. Scalar field is also responsible for existence of dimensions and scale in universe.

2.10. Mathematical Aspects of Quantity in a Body (ψ) (Mass in Modern Aspect)

Now I am obtaining a beautiful mathematical expression by using two equations obtained by me in my two former papers-

$$\psi = \psi_p + \alpha\Delta\phi \tag{92}$$

And

$$\psi = \alpha\phi \ or \ \psi - \alpha\phi = 0 \tag{93}$$

{This equation holds for one type of particles (Bodies)}

Or

$$\psi^\dagger = -\alpha\phi^\dagger \ or \ \psi^\dagger + \alpha\phi^\dagger = 0 \tag{94}$$

{Here $\psi^\dagger$ is the conjugate of ψ}

Now by multiplying both equations (93) and (94), we get-

$$(\psi - \alpha\phi)(\psi^\dagger + \alpha\phi^\dagger) = 0$$

$$\psi\psi^\dagger - \alpha\phi\psi^\dagger + \alpha\psi\phi^\dagger - \alpha^2\phi\phi^\dagger = 0 \tag{95}$$

$$\{\because E_\psi = \psi\psi' = \alpha^2\phi\phi' = E_\psi'\}$$

Or

$$\psi = \alpha\phi', \psi^\dagger + \alpha\phi'^\dagger$$

So

$$\psi\psi^\dagger = \alpha^2\phi'\phi'^\dagger = \alpha^2\phi\phi^\dagger$$

Now the equation (95) becomes-

$$\alpha\{\phi\psi^\dagger - \psi\phi^\dagger\} = 0 \tag{96}$$

$$\alpha\{\psi\phi^\dagger - \phi\psi^\dagger\} = 0 \tag{97}$$

Now by taking conjugate of equation (92), we get-

$$\psi^\dagger = \psi_p^\dagger + \alpha\Delta\phi^\dagger \tag{98}$$

$\because \psi^\dagger = -\alpha\phi^\dagger$ by equation (94)-

$$-\alpha\phi^\dagger = \psi_p^\dagger + \alpha\Delta\phi^\dagger$$

Or

$$\psi_p^\dagger + \alpha\Delta\phi^\dagger + \alpha\phi^\dagger = 0 \tag{100}$$

Now by equation (92)-

$$\psi_p + \alpha\Delta\phi - \alpha\phi = 0 \tag{101}$$

Now by multiplying equation (100) and (101), we get-

$$(\psi_p + \alpha\Delta\phi - \alpha\phi)(\psi_p^\dagger + \alpha\Delta\phi^\dagger + \alpha\phi^\dagger) = 0 \tag{102}$$

$$\psi_p\psi_p^\dagger + \alpha\psi_p^\dagger\Delta\phi + \alpha\psi_p\phi^\dagger + \alpha^2\Delta\phi\Delta\phi^\dagger + \alpha\psi_p\Delta\phi^\dagger + \alpha^2\Delta\phi\phi^\dagger - \alpha^2\phi\Delta\phi^\dagger - \alpha\phi\psi_p^\dagger - \alpha^2\phi\phi^\dagger = 0 \tag{103}$$

Now by putting ψ & $\psi^\dagger$ values from equation (92) and (97) into equation (96), we get-

$$\alpha\{\psi_p\phi^\dagger + \alpha\Delta\phi\phi^\dagger - \psi_p^\dagger\phi - \alpha\Delta\phi^\dagger\phi\} = 0 \tag{104}$$

Now by separating similar terms like in equation (104) in equation (103), we get-

$$\psi_p\psi_p^\dagger - \alpha^2\phi\phi^\dagger + \alpha\{\psi_p\phi^\dagger + \alpha\Delta\phi\phi^\dagger - \psi_p^\dagger\phi - \alpha\Delta\phi^\dagger\phi\} + \alpha\psi_p\Delta\phi^\dagger + \alpha\psi_p^\dagger\Delta\phi + \alpha^2\Delta\phi\Delta\phi^\dagger = 0 \tag{105}$$

Now I putting 3rd term equal to zero in equation (105)-

$$\psi_p\psi_p^\dagger - \alpha^2\phi\phi^\dagger + \alpha\{\psi_p\Delta\phi^\dagger + \psi_p^\dagger\Delta\phi + \alpha\Delta\phi\Delta\phi^\dagger\} = 0 \tag{106}$$

Now by relation $\psi\psi^\dagger = \alpha^2\phi\phi^\dagger$, we can write equation (106) as-

$$\psi_p\psi_p^\dagger - \psi\psi^\dagger + \alpha\{\psi_p\Delta\phi^\dagger + \psi_p^\dagger\Delta\phi + \alpha\Delta\phi\Delta\phi^\dagger\} = 0 \tag{107}$$

Or we get-

$$\psi\psi^\dagger - \psi_p\psi_p^\dagger = \alpha\{\psi_p\Delta\phi^\dagger + \psi_p^\dagger\Delta\phi + \alpha\Delta\phi\Delta\phi^\dagger\} \tag{108}$$

Now by using $\psi - \psi_p = \alpha\Delta\phi$ or $\psi^\dagger - \psi_p^\dagger = \alpha\Delta\phi^\dagger$ in equation (108), we get-

$$\psi\psi^\dagger - \psi_p\psi_p^\dagger = \psi_p^\dagger\psi - \psi_p\psi_p^\dagger + \psi_p\psi^\dagger - \psi_p\psi_p^\dagger + \alpha^2\Delta\phi\Delta\phi^\dagger \tag{109}$$

Now by some manipulation in above equation, we get-

$$\psi\psi^\dagger + \psi_p\psi_p^\dagger = \{\psi_p^\dagger\psi + \psi_p\psi^\dagger\} + \alpha^2\Delta\phi\Delta\phi^\dagger \tag{110}$$

Or we can write it as-

$$\{\psi\psi^\dagger + \psi_p\psi_p^\dagger\} - \{\psi_p^\dagger\psi + \psi_p\psi^\dagger\} = \alpha^2\Delta\phi\Delta\phi^\dagger \tag{111}$$

Now I intend to prove equivalence of the relation-

$$E_\psi = \psi\psi' = \alpha^2\phi\phi' = E_\psi' \tag{112}$$

As we know $E_\psi = \alpha\psi\phi$ or

$\because\ \psi' = \alpha\phi$ or $\alpha\phi' = \psi$ or $(\psi')' = \psi$

(113)

Now by taking complement of E_ψ , we get-

$$\begin{aligned} E_\psi' &= (\alpha\psi\phi)' = (\psi\psi')' \\ &= \alpha\psi'\phi' \\ &= (\alpha\phi').\psi' \\ &= \psi\psi' = E_\psi \end{aligned} \tag{114}$$

In similar way we can prove relations $E = E'$ and $E_\phi = E_\phi'$. Now by taking complex conjugate of equation (113)-

$$(\psi')^\dagger = \alpha\phi^\dagger \tag{115}$$

$$\alpha(\phi')^\dagger = \psi^\dagger \tag{116}$$

$$\because E_\psi = \alpha\psi\phi = \alpha\psi'\phi'$$

Now by putting above relations in $\alpha^2\phi\phi^\dagger = \psi\psi^\dagger$, we get-

$$(\alpha\phi).(\alpha\phi^\dagger) = \psi'(\psi')^\dagger \tag{117}$$

$$\because \psi'(\psi')^\dagger = (\psi\psi^\dagger)'$$

So, we can write equation (117) as-

$$\alpha^2\phi\phi^\dagger = (\psi\psi^\dagger)' \tag{118}$$

Now by equation (116)-

$$\alpha^2\phi\phi^\dagger = \alpha(\psi'(\phi^\dagger)')' \tag{119}$$

Now by putting $\alpha\phi' = \psi$ from equation (113), we get-

$$\begin{aligned} \alpha^2\phi\phi^\dagger &= \alpha^2(\phi'(\phi^\dagger)')' \\ &= \alpha^2((\phi\phi^\dagger)')' \\ &= \alpha^2\phi\phi^\dagger \end{aligned} \tag{120}$$

So, we have proven that the relation $\alpha^2\phi\phi^\dagger = (\psi\psi^\dagger)$ holds.

Now from equation (11)-

$$\Phi_S^\circ + \Phi_L^\circ + \Phi_M^\circ = \sum_{n=-\infty}^{\infty} (\phi;\phi)_n(\phi^\dagger;\phi^\dagger)_n(-\phi;\phi)_n(-\phi^\dagger;\phi^\dagger)_n$$

Now by writing all 3 scalar field functions in terms of their generators as-

$$\Phi_M^\circ = \sum_{n=-\infty}^{\infty} (\phi;\phi)_n(\phi\phi^\dagger\phi;\phi\phi^\dagger\phi)_n(\phi\phi\phi;\phi\phi\phi)_n(\phi^\dagger\phi^\dagger\phi^\dagger;\phi^\dagger\phi^\dagger\phi^\dagger)_n \tag{121}$$

$$\Phi_L^\circ = \sum_{n=-\infty}^{\infty} (\phi\phi^\dagger;\phi\phi^\dagger)_n(\phi\phi\phi\phi^\dagger;\phi\phi\phi\phi^\dagger)_n\,(\phi^\dagger\phi\phi^\dagger\phi;\phi^\dagger\phi\phi^\dagger\phi)_n(\phi^\dagger\phi^\dagger\phi^\dagger\phi^\dagger;\phi^\dagger\phi^\dagger\phi^\dagger\phi^\dagger)_n \tag{122}$$

$$\Phi_S^\circ = \sum_{n=-\infty}^{\infty} (\phi^2;\phi^2)_n((\phi^\dagger)^2;(\phi^\dagger)^2)_n(\phi^4;\phi^4)_n((\phi^\dagger)^4;(\phi^\dagger)^4)_n \tag{123}$$

These scalar field functions can be positive or negative according to situation.

Now these three expressions must be equal to the equation (11) by some combinations-

$$M^{\circ}\sum_{n=-\infty}^{\infty}(\phi;\phi)_n(\phi\phi^{\dagger}\phi;\phi\phi^{\dagger}\phi)_n.(\phi\phi\phi;\phi\phi\phi)_n*(\phi^{\dagger}\phi^{\dagger}\phi^{\dagger};\phi^{\dagger}\phi^{\dagger}\phi^{\dagger})_n+L^{\circ}\sum_{n=-\infty}^{\infty}(\phi\phi^{\dagger};\phi\phi^{\dagger})_n(\phi^{\dagger}\phi^{\dagger}\phi^{\dagger}\phi^{\dagger};\phi^{\dagger}\phi^{\dagger}\phi^{\dagger}\phi^{\dagger})_n$$
$$*(\phi^{\dagger}\phi\phi^{\dagger}\phi;\phi^{\dagger}\phi\phi^{\dagger}\phi)_n(\phi\phi\phi\phi^{\dagger};\phi\phi\phi\phi^{\dagger})_n+S^{\circ}\sum_{n=-\infty}^{\infty}(\phi^2;\phi^2)_n((\phi^{\dagger})^2;(\phi^{\dagger})^2)_n(\phi^4;\phi^4)_n((\phi^{\dagger})^4;(\phi^{\dagger})^4)_n$$
$$=\sum_{n=-\infty}^{\infty}(\phi;\phi)_n(\phi^{\dagger};\phi^{\dagger})_n(-\phi;\phi)_n(-\phi^{\dagger};\phi^{\dagger})_n \tag{124}$$

{Here S°, L° and M° are linear combination constants}

So, we can write equation (11) in more clear way as-

$$\Phi_S^{\circ}S^{\circ}+\Phi_L^{\circ}L^{\circ}+\Phi_M^{\circ}M^{\circ}=\sum_{n=-\infty}^{\infty}(\phi;\phi)_n(\phi^{\dagger};\phi^{\dagger})_n(-\phi;\phi)_n(-\phi^{\dagger};\phi^{\dagger})_n \tag{125}$$

This equation will be completely generalized in the mathematical phase of paper. Now by equation (111) we can write-

$$\psi\{\psi^{\dagger}-\psi_p^{\dagger}\}-\psi_p\{\psi^{\dagger}-\psi_p^{\dagger}\}=\alpha^2\Delta\phi\Delta\phi^{\dagger} \tag{126}$$

Or we can write it as-

$$(\psi-\psi_p)(\psi^{\dagger}-\psi_p^{\dagger})=\alpha^2\Delta\phi\Delta\phi^{\dagger} \tag{127}$$

So, we can prove this expression right by expressions (92) and (97). Now by putting $\psi=\alpha\phi$ and $\psi^{\dagger}=-\alpha\phi^{\dagger}$ in equation (127), we get-

$$-(\alpha\phi-\psi_p)(\alpha\phi^{\dagger}+\psi_p^{\dagger})=\alpha^2\Delta\phi\Delta\phi^{\dagger} \tag{128}$$

Now by solving further-

$$(\psi_p-\alpha\phi)(\alpha\phi^{\dagger}+\psi_p^{\dagger})=\alpha^2\Delta\phi\Delta\phi^{\dagger}$$
$$\Rightarrow\psi_p\psi_p^{\dagger}-\alpha^2\phi\phi^{\dagger}-\alpha\psi_p^{\dagger}\phi+\alpha\psi_p\phi^{\dagger}=\alpha^2\Delta\phi\Delta\phi^{\dagger} \tag{129}$$

Now we can write it as-

$$\psi_p\psi_p^{\dagger}=\alpha^2(\Delta\phi\Delta\phi^{\dagger}+\phi\phi^{\dagger})+\alpha\{\psi_p^{\dagger}\phi-\psi_p\phi^{\dagger}\} \tag{130}$$

Now by relation (96)-

$$\alpha\{\psi\phi^{\dagger}-\phi\psi^{\dagger}\}=0$$

{$\because\psi_p^{\dagger}+\alpha\Delta\phi^{\dagger}=\psi^{\dagger}$ or $\psi_p+\alpha\Delta\phi=\psi$}

So, we can write relation (96), as-

$$\alpha\{\psi_p^{\dagger}\phi-\psi_p\phi^{\dagger}\}+\alpha^2(\phi\Delta\phi^{\dagger}-\Delta\phi\phi^{\dagger})=0 \tag{131}$$

Now by putting value of $\alpha\{\psi_p^{\dagger}\phi-\psi_p\phi^{\dagger}\}$ from equation (131) to (130), we get-

$$\psi_p\psi_p^{\dagger}=\alpha^2(\Delta\phi\Delta\phi^{\dagger}+\phi\phi^{\dagger}-\phi\Delta\phi^{\dagger}+\Delta\phi\phi^{\dagger}) \tag{132}$$

Now if we want to convert this relation in $\psi\psi^{\dagger}$, then by using equations (92) and (96), we get-

$$(\psi-\alpha\Delta\phi)(\psi^{\dagger}-\alpha\Delta\phi^{\dagger})=\alpha^2(\Delta\phi\Delta\phi^{\dagger}+\phi\phi^{\dagger}-\phi\Delta\phi^{\dagger}+\Delta\phi\phi^{\dagger}) \tag{133}$$

$$\psi\psi^{\dagger}-\alpha\psi\Delta\phi^{\dagger}-\alpha\psi^{\dagger}\Delta\phi+\alpha^2\Delta\phi\Delta\phi^{\dagger}=\alpha^2(\Delta\phi\Delta\phi^{\dagger}+\phi\phi^{\dagger}-\phi\Delta\phi^{\dagger}+\Delta\phi\phi^{\dagger}) \tag{134}$$

Now by cancelling similar terms-

$$\psi\psi^{\dagger}-\alpha\{\psi\Delta\phi^{\dagger}+\psi^{\dagger}\Delta\phi\}=\alpha^2(\phi\phi^{\dagger}-\phi\Delta\phi^{\dagger}+\Delta\phi\phi^{\dagger}) \tag{135}$$

Now by using $\psi=\alpha\phi'$ and $\psi^{\dagger}=-\alpha\phi^{\dagger}$ in equation (135), we get the equation in form of ϕ, as-

$$-\alpha^2\phi'\phi^{\dagger}-\alpha\{\psi\Delta\phi^{\dagger}+\psi^{\dagger}\Delta\phi\}=\alpha^2(\phi\phi^{\dagger}-\phi\Delta\phi^{\dagger}+\Delta\phi\phi^{\dagger}) \tag{136}$$

By solving further-

$$\alpha^2\left((\phi\phi^{\dagger}+\phi'\phi^{\dagger})+\Delta\phi(\phi^{\dagger}-\phi'^{\dagger})+\Delta\phi^{\dagger}(\phi'-\phi)\right)=0 \tag{137}$$

We can also write equation (135), as-

$$\because\psi\psi^{\dagger}=\alpha^2\phi\phi^{\dagger}$$
$$-\alpha\{\psi\Delta\phi^{\dagger}+\psi^{\dagger}\Delta\phi\}=\alpha^2(\Delta\phi\phi^{\dagger}-\phi\Delta\phi^{\dagger}) \tag{138}$$

Now by solving equation (138) further, we get-

$$\Delta\phi(\alpha\phi^{\dagger}+\psi^{\dagger})+\Delta\phi^{\dagger}(\psi-\alpha\phi)=0 \tag{139}$$

From this equivalence my former to relations holds-

$$\alpha\phi^{\dagger} + \psi^{\dagger} = 0 \ or \ \psi - \alpha\phi = 0 \tag{140}$$

2.11. Scalar Fields Around Perfect and Imperfect Bodies

Now I am explaining some geometrical configurations here to answer the queries like do perfect or imperfect bodies occupy different scalar fields and if these occupy different scalar fields, then what should be the generators for the scalar field so perfect or imperfect bodies and how they interact with each other or with universal scalar field? How to answer these fundamental queries let's go to the diagram (2) or universal representation of scalar fields or by examining the situation (c) in that particular diagram. We found that in situation (c) the body contains mixing of Φ_L° and Φ_S° into its own scalar field and interact with the universal scalar field (Φ_u) as Φ_M°. Now I am representing a body closely which exists in situation (c)-

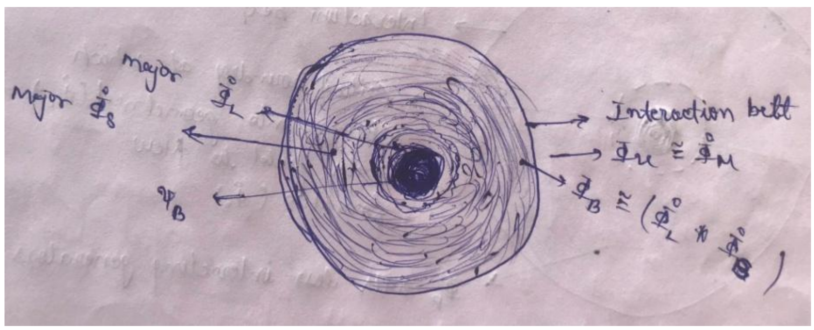


Fig. 10 –Representation of Scalar fields around a Body

Now as we know-

$$\psi_B = (\psi_B)_p + \alpha\Delta\Phi_B \tag{141}$$

Now one query must be hitting your mental lexicon that on which place we find Φ_L° more or on which place we find Φ_S° more in the scalar field of body? The answer of this beautiful question is lie into the recognition of Φ_L° and Φ_S° that Φ_L° shapes geometry of body or Φ_S° is responsible for new formation in body. Usually the answer of this question varies is in all three situations of the universal representation diagram of scalar fields 'a', 'b' & 'c' because in these three situations contribution of these scalar fields very as I shown in figure (2). So, the things shapes the geometry of body is closer to the quantity of body (ψ). So, measure scalar field near two the quantity is Φ_L° and after that major scalar field which create something in body is Φ_S°. Both of these interact with universal scalar field Φ_u° as Φ_M°. So, generator of scalar field open a body are in form of generators of Φ_L° and Φ_S° or in another sense generators of a particular bodies scalar field in universe are in form of some combination of $\phi\phi^{\dagger}, \phi\phi\phi\phi^{\dagger}$, $\phi^{\dagger}\phi\phi^{\dagger}\phi, \phi\phi^{\dagger}\phi^{\dagger}\phi^{\dagger}$, $\phi^2, (\phi^{\dagger})^2, \phi^4$, $(\phi^{\dagger})^4$etc. Now as I described in my former article [2] that a perfect body have less interacting scalar field. So, perfect bodies should contain less interacting generators and an imperfect body contains more interacting generators. So, the scalar field open in perfect body is more interacting than perfect body. Now we can generalize relations between η and generators of a scalar field around a body. Now the question comes out that which are the less interacting generators and which are more interacting generators? To answer this query I am representing two bodies differently one of them is perfect and another one is imperfect as I did in my second paper [2]. So, at first I am representing a body which is perfect ($\eta \to 1$)-

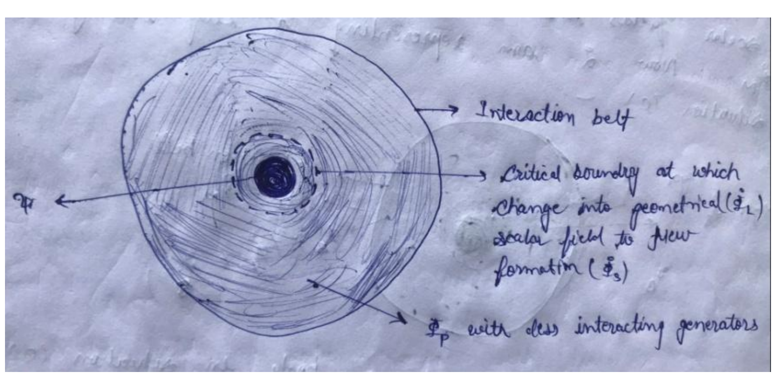


Fig. 11 –Scalar fields around a Perfect Body

$$\because \eta = \frac{\psi - \alpha\phi}{\psi + \alpha\phi} \; or \; \psi = \psi_p + \alpha\Delta\phi \; so, here \; \alpha\Delta\phi \to 0$$

As we know-

$$\Phi_P \cong \Phi_L^{\circ} \otimes \Phi_S^{\circ}$$

So, the perfect body have a scalar field with less interacting generators,But as we know in some formerly poach a perfect body was imperfect and by tendency to perfection the body becomes gradually perfect. As from this hypothesis Imperfect body have more interacting scalar field generators. So, the generators of scalar fields also change with the dynamics of universe. I am representing status of these generators in universal diagram as-

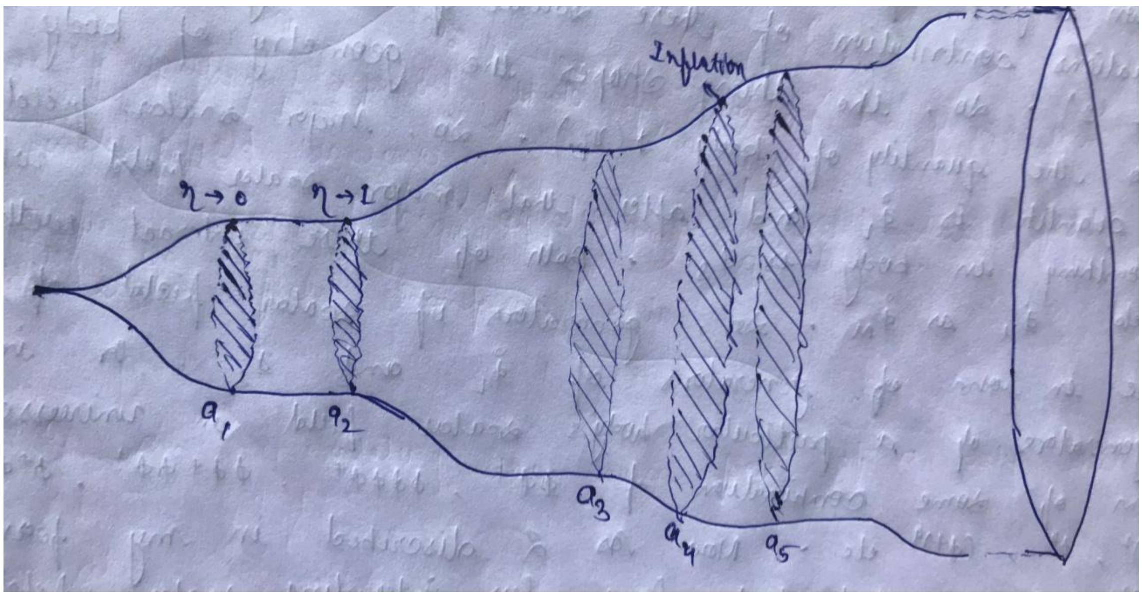


Fig. 12 –Status of Generators of Scalar Fields in different epochs of Universe

At Epoch a_1 generators of scalar fields around geometries are more interacting but at epoch a_2 generators of scalar fields around Geometries or bodies are less interacting because as from my 4th paper [4] I described that at epoch $a_1(\eta \to 1)$ and at epoch $a_2(\eta \to 1)$ for bodies. Now we can clearly see from diagram that at epoch $a_3(\eta \to 1)$ or generators of scalar fields are less interacting and by passing through a_4 (inflationary epoch) the less interacting scalar field generators rapidly converting more interacting generators of scalar fields is approaching $a_5(\eta \to 0)$.

2.12. Interacting Strength of Scalar Field Generators

So, we can conclude one fact from the above analysis that measurement quantity of scalar fields Interacting strength (Let's denote it by I°) generators interacting strength is anti proportional to perfection constant (η) or we can represent it by mathematical expression as-

$$\boxed{I^{\circ} \propto \frac{1}{\eta}} \tag{142}$$

Now by removing the proportionality constant as i°, we can write equation (142) as-

$$\boxed{I^{\circ} = \frac{i^{\circ}}{\eta}} \tag{143}$$

$$I^{\circ} = i^{\circ}\left(\frac{\psi + \alpha\phi}{\psi - \alpha\phi}\right) \tag{144}$$

So, as $\psi \to \alpha\phi$ or $\psi \approx \alpha\phi$ the interacting strength of scalar field generator increases rapidly. As we know from the universal diagram that during inflation η increases and during deflation η decreases (or tendency to perfection).we can also call inflation as imperfection age. We can represent universal characteristics diagram in form of I° as-

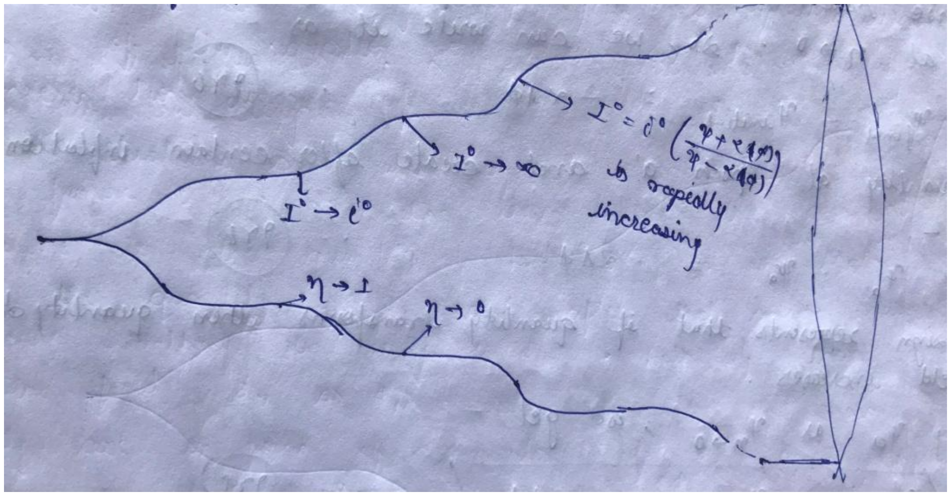


Fig. 13 –Scalar Field Generator's Strengths in Universe

We can also write I° as-

$$I^{\circ} = i^{\circ}\left(\frac{\psi_p + \alpha(\Delta\phi + \phi)}{\psi + \alpha(\Delta\phi - \phi)}\right) \tag{145}$$

Or this can be written as-

$$I^{\circ} = \alpha i^{\circ}\left(\frac{\phi' + \phi}{\phi' - \phi}\right) \tag{146}$$

Here $\Delta\phi$ is the transformed scalar field but ϕ' is the scalar field output of total quantity of body or the quantity can be transformed in scalar field as ϕ'. Now I am representing the scalar field of a body which is imperfect or$(\eta \to 0)$ as -

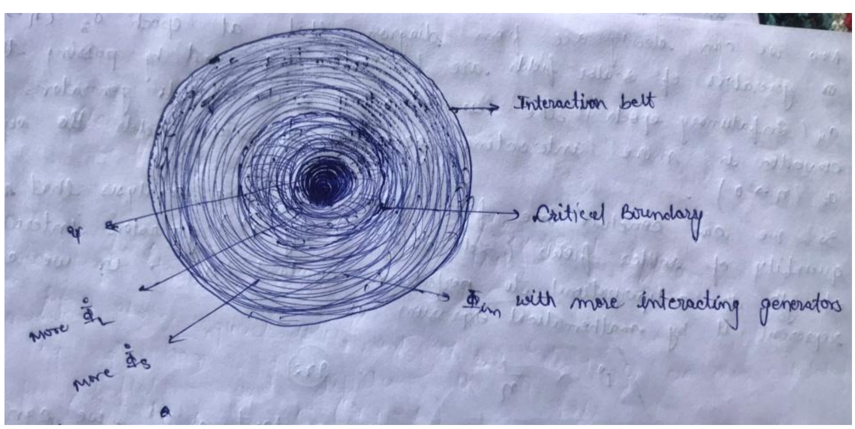


Fig. 14 –Scalar Fields around an Imperfect Body

Here in this diagram of imperfect body the critical boundary is far in comparison with perfect body because geometry of imperfect body is under construction but the geometry of perfect body is already shaped. Now I intend to answer the question that how generators of scalar fields of bodies evolve with time?

2.13. Quantities During Inflations and Deflations

Now from equation (70)-

$$\psi = \psi_p + \Delta\psi$$

Or

$$|\Delta\psi| = |\alpha\Delta\phi| \; for\ \phi - \psi\ transformation$$

As we know we have calculated the transformation from when the body was created and the new body creates in universe by universal inflations or when older bodies have $\eta \to 1$. After inflation the new body has $\eta \to 0$. So, we can calculate the ϕ-ψ transformation by taking that initial quantity at $\eta \to 0$. So, we can write it as-

$$\psi_{final} - \psi_{initial} = -\alpha\Delta\phi \tag{147}$$

Or for a quantity epoch a' and create after certain inflation at epoch a, then-

$$\psi_{a'} - \psi_a = -\alpha\Delta\phi \tag{148}$$

Here negative sign represents that if quantity transforms, then quantity decreases and scalar field increases. Now by putting ψ_a as $\psi_{\eta\to 0}$, we get-

$$\psi_{current} - \psi_{\eta\to 0} = -\alpha\Delta\phi \tag{149}$$

Usually in inflation quantity transforms into scalar field and in deflation scalar field transforms into quantity. So for inflations the equation for quantity becomes-

$$\psi_i = \psi_p - |\alpha\Delta\phi| \tag{150}$$

Or in deflations-

$$\psi_d = \psi_p + |\alpha\Delta\phi| \tag{151}$$

Now by taking mode of equation-

$$\Delta\psi = -\alpha\Delta\phi \tag{152}$$

$$|\Delta\psi| = |\alpha\Delta\phi| \tag{153}$$

Now by putting equation (143) in equation (150) and equation (151), we get-

$$\begin{cases} \psi_i = \psi_p - |\alpha\Delta\phi| & (154) \\ \psi_d = \psi_p + |\alpha\Delta\phi| & (155) \end{cases}$$

So, for inflation and deflation is the η_i and η_d can be calculated as-

$$\begin{cases} \eta_i = \dfrac{\psi_p - |\alpha\Delta\phi| - \alpha\phi}{\psi_p - |\alpha\Delta\phi| + \alpha\phi} & (156) \\ \eta_d = \dfrac{\psi_p + |\alpha\Delta\phi| - \alpha\phi}{\psi_p + |\alpha\Delta\phi| + \alpha\phi} & (157) \end{cases}$$

Usually we were calculating formerly the whole quantity for age of deflation. As we know in inflations universe accelerate or in definitions universe slows its speed by negative acceleration. So, expansion rate of universe is directly related to ϕ-ψ transformation and perfection constant of universe (η_u). Some cosmologists decline Big Bang Theory and accept oscillatory universe due to above illusion of inflation and deflation.

Now as we know from my former paper [5], that-

$$\psi_{total} = \psi + \psi' \tag{158}$$

$\because \psi' = \alpha\phi$ Or by using equation (154) and (155) for inflations and deflations, we get-

$$(\psi_t)_i = \psi_p - |\alpha\Delta\phi| + \alpha\phi \tag{159}$$

Or

$$(\psi_t)_d = \psi_p + |\alpha\Delta\phi| + \alpha\phi \tag{160}$$

Or we can write both equations as-

$$\begin{cases} (\psi_t)_i = \psi_p - |\alpha\Delta\phi| + \alpha\phi & (161) \\ (\psi_t)_d = \psi_p + |\alpha\Delta\phi| + \alpha\phi & (162) \end{cases}$$

In similar way for a scalar field-

$$\phi_t = \phi + \phi' \tag{163}$$

$\because \frac{\psi}{\alpha} = \phi'$ Or by using equation (163), we get-

$$\phi_t = \phi + \frac{\psi_p}{\alpha} \pm |\Delta\phi| \tag{164}$$

Now by multiplying equation (164) with α both sides, we get-

$$\alpha\phi_t = \alpha\phi + \psi_p \pm |\alpha\Delta\phi|$$

(165)

Now by separating equation (165) for inflations and deflations-

$$(\alpha\phi_t)_i = \psi_p + \alpha(\phi - |\Delta\phi|) \tag{166}$$

$$(\alpha\phi_t)_d = \psi_p + \alpha(\phi + |\Delta\phi|) \tag{167}$$

So, equations (166) and (167) are similar to equations (161) and (162), or we can define from above equivalence that $(\psi_t)_i = (\alpha\phi_t)_i$ and $(\psi_t)_d = (\alpha\phi_t)_d$ are equivalent.

Now by equation (144), we know-

$$I^{\circ}(\psi - \alpha\phi) = i^{\circ}(\psi + \alpha\phi) \tag{168}$$

Now by putting (154) and (155) in equation (168), we get two different type of interacting strengths for scalar field generators (I_i° & I_d°)-

$$I_i^{\circ}\left(\psi_p - \alpha(\phi + |\Delta\phi|)\right) = i^{\circ}\left(\psi_p + \alpha(\phi - |\Delta\phi|)\right) \tag{169}$$

$$I_d^{\circ}\left(\psi_p - \alpha(\phi - |\Delta\phi|)\right) = i^{\circ}\left(\psi_p + \alpha(\phi + |\Delta\phi|)\right) \tag{170}$$

Now by using equations (161) and (162) in above, we get-

$$I_i^{\circ}\left(\psi_p - \alpha(\phi + |\Delta\phi|)\right) = i^{\circ}(\psi_t)_i \tag{171}$$

$$I_d^{\circ}\left(\psi_p - \alpha(\phi - |\Delta\phi|)\right) = i^{\circ}(\psi_t)_d \tag{172}$$

Now by differentiating both equations with respect to time, we get-

$$\frac{\partial I_i^{\circ}}{\partial\tau}\left(\psi_p - \alpha(\phi + |\Delta\phi|)\right) + I_i^{\circ}\frac{\partial}{\partial\tau}\left(\psi_p - \alpha(\phi + |\Delta\phi|)\right) = \frac{\partial i^{\circ}}{\partial\tau}(\psi_t)_i + i^{\circ}\frac{\partial(\psi_t)_i}{\partial\tau} \tag{173}$$

So, we have got a linear differential equation of evolution of scalar field in generator strength during inflations (I_i°).

In similar way for deflations-

$$\frac{\partial I_d^{\circ}}{\partial\tau}\left(\psi_p - \alpha(\phi - |\Delta\phi|)\right) + I_d^{\circ}\frac{\partial}{\partial\tau}\left(\psi_p - \alpha(\phi - |\Delta\phi|)\right) = \frac{\partial i^{\circ}}{\partial\tau}(\psi_t)_d + i^{\circ}\frac{\partial(\psi_t)_d}{\partial\tau} \tag{174}$$

2.14. Norma, Critical and Interaction Radius of Bodies and Parameters Associated with these Radius

Now I am representing some another parameters in a body, as-

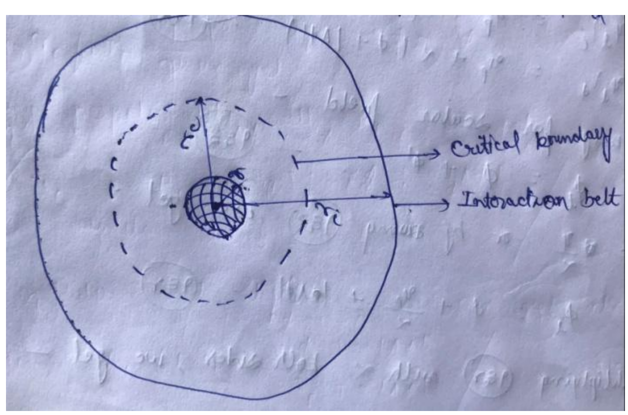


Fig. 15 –Representation of Various Kinds of Radius Around a Body

Here r is for ψ_p part of body, r_c is critical radius where nature of interaction changes for body and r_i is the radius for whole body (with the scalar field) at its interaction belt. Now as I defined previously that for perfect bodies ($\eta \to 1$) the critical boundary is near but for imperfect body ($\eta \to 0$) critical boundaries is far. So, from this ideology the relation between r_c and η comes out as-

$$r_c \propto (1 - \eta) \tag{175}$$

$$\{\because 1 - \eta = \eta^*\}$$

So, relation (175) becomes-

$$r_c \propto \eta^* \tag{176}$$

Now by removing proportionality of above relation with constant which is valid for a particular kind of bodies (or geometries) out of n-bodies-

$$\boxed{r_c = R_c(1-\eta)} \tag{177}$$

Now I am finding out relation between r and ψ_p as-

$$r \propto \frac{1}{\psi_p} \tag{178}$$

Or radius or quantity part is anti proportional to how much quantity it contains perfectly and proportional to how much quantity it contains imperfectly or converged-

$$r \propto \alpha\Delta\phi \tag{179}$$

Now by removing proportionality as did for r_c, we get-

$$\boxed{\boldsymbol{r = R\frac{\alpha\Delta\phi}{\psi_p}}} \tag{180}$$

In same manner r_i but here this is proportional to $\alpha\phi \pm \alpha|\Delta\phi|$-

$$r_i \propto \alpha\phi \pm \alpha|\Delta\phi| \tag{181}$$

And this radius is ant proportional to the quantity (ψ) of the body-

$$r_i \propto \frac{(1-\eta)}{\psi} \tag{182}$$

Now by removing proportionality with R_i, we get-

$$\boxed{\boldsymbol{r_i = R_i(1-\eta).\frac{\alpha\phi \pm \alpha|\Delta\phi|}{\psi}}} \tag{183}$$

Here $\pm$ is for inflations and deflations respectively. We can write also to r_i as-

$$\boxed{\boldsymbol{r_i = R_i(1-\eta).\frac{\alpha\phi \pm \alpha|\Delta\phi|}{\psi_p \mp \alpha|\Delta\phi|}}} \tag{184}$$

Now let's assume three other types of distances-

$$x = r_c - r \tag{185}$$

And

$$y = r_i - r \tag{186}$$

Or

$$z = r_i - r_c \tag{187}$$

So, we can write these as-

$$x = R_c(1-\eta) - R\frac{\alpha\Delta\phi}{\psi_p} \tag{188}$$

$$y = R_i(1-\eta).\frac{\alpha\phi \pm \alpha|\Delta\phi|}{\psi_p \mp \alpha|\Delta\phi|} - R\frac{\alpha\Delta\phi}{\psi_p} \tag{189}$$

$$z = R_i(1-\eta).\frac{\alpha\phi \pm \alpha|\Delta\phi|}{\psi_p \mp \alpha|\Delta\phi|} - R_c(1-\eta) \tag{190}$$

These three parameters are helpful to define nature of a body and n-body problems. As we know in inflations $\psi = \psi_p - \alpha|\Delta\phi|$, so-

$$z_i = R_i(1-\eta).\frac{\alpha\phi + \alpha|\Delta\phi|}{\psi_p - \alpha|\Delta\phi|} - R_c(1-\eta) \tag{191}$$

So, during inflations the parameter z_i increases for a body. We can write z also as-

$$z = (1-\eta)\left[R_i.\frac{\alpha\phi \pm \alpha|\Delta\phi|}{\psi_p \mp \alpha|\Delta\phi|} - R_c\right] \tag{192}$$

$$\because (1-\eta) = \eta^*$$

So, we can write z as-

$$z = \eta^*\left[R_i.\frac{\alpha\phi \pm \alpha|\Delta\phi|}{\psi_p \mp \alpha|\Delta\phi|} - R_c\right] \tag{193}$$

$$\left\{\because \eta = \frac{\psi_p \pm |\alpha\Delta\phi| - \alpha\phi}{\psi_p \pm |\alpha\Delta\phi| + \alpha\phi}\right\}$$

So

$$\eta^* = 1 - \frac{\psi_p \pm |\alpha\Delta\phi| - \alpha\phi}{\psi_p \pm |\alpha\Delta\phi| + \alpha\phi} \tag{194}$$

Now I solving equation (194) further, we get-

$$\eta^* = \frac{\psi_p \pm |\alpha\Delta\phi| + \alpha\phi - (\psi_p \pm |\alpha\Delta\phi| - \alpha\phi)}{\psi_p \pm |\alpha\Delta\phi| + \alpha\phi} \tag{195}$$

Now by removing similar terms-

$$\eta^* = \frac{2\alpha\phi}{\psi_p \pm |\alpha\Delta\phi| + \alpha\phi} \tag{196}$$

Now as we know-

$$\psi' = \alpha\phi$$

By taking variation of above equation, we get-

$$\Delta\psi' = \Delta\alpha\phi + \alpha\Delta\phi \tag{197}$$

So, we can write $\alpha\Delta\phi$ as-

$$\alpha\Delta\phi = \Delta\psi' - \frac{\Delta\alpha}{\alpha}\psi' \tag{198}$$

Now by putting this value in equation (196), we get-

$$\eta^* = \frac{2\psi'}{\psi_p \pm \left(\Delta\psi' - \frac{\Delta\alpha}{\alpha}\psi'\right) + \alpha\phi} \tag{199}$$

Now by solving it further-

$$\eta^* = \frac{2\alpha\psi'}{\alpha(\psi_p + \psi') \pm (\alpha\Delta\psi' - \Delta\alpha\psi')} \tag{200}$$

We can also make η without scalar field as-

$$\eta = \frac{\psi_p \pm |\alpha\Delta\phi| - \alpha\phi}{\psi_p \pm |\alpha\Delta\phi| + \alpha\phi} \tag{201}$$

Now by putting equation (197) with in equation (201), we get-

$$\eta = \frac{\psi_p \pm \left(\Delta\psi' - \frac{\Delta\alpha}{\alpha}\psi'\right) - \psi'}{\psi_p \pm \left(\Delta\psi' - \frac{\Delta\alpha}{\alpha}\psi'\right) + \psi'} \tag{202}$$

Now I solving further to equations (202), we get-

$$\eta = \frac{\alpha(\psi_p - \psi') \pm (\alpha\Delta\psi' - \Delta\alpha\psi')}{\alpha(\psi_p + \psi') \pm (\alpha\Delta\psi' - \Delta\alpha\psi')} \tag{203}$$

Now by removing α from both parts, we get-

$$\eta = \frac{(\psi_p - \psi') \pm \left(\Delta\psi' - \frac{\Delta\alpha}{\alpha}\psi'\right)}{(\psi_p + \psi') \pm \left(\Delta\psi' - \frac{\Delta\alpha}{\alpha}\psi'\right)} \tag{204}$$

So, equation (204) is scalar field less equation for η. Now I am defining another exciting fact behind the whole quantity which is coming out from η. As we know-

$$\eta \in [0,1]$$

Or

$$0 \leq \eta \leq 1 \tag{205}$$

So

$$0 \leq \frac{\psi - \alpha\phi}{\psi + \alpha\phi} \leq 1 \tag{206}$$

Now we can write it as-

$$0 \leq \psi - \alpha\phi \leq \psi + \alpha\phi \tag{207}$$

Now by separating relation to (207) in two forms as-

$$\begin{cases} \psi - \alpha\phi \geq 0 & (208) \\ \psi - \alpha\phi \leq \psi + \alpha\phi & (209) \end{cases}$$

So, by equation (208) we can conclude-

$$\psi \geq \alpha\phi \tag{210}$$

So, the equation (210) becomes-

$$\psi \geq \psi' \tag{211}$$

So, "when we convert out reschedule field of a body in quantity totally, then also it will not exceed the former quantity". Now by using equation (209), we get-

$$\psi \leq \psi + 2\alpha\phi \tag{212}$$

Or

$$\psi \leq \psi + 2\psi' \tag{213}$$

From here the fact comes out $\psi' \geq 0$ or the conversed quantity will always positive. So, from here limits for ψ' comes out as-

$$0 \leq \psi' \leq \psi \tag{214}$$

Or in another sense-

$$0 \leq \alpha\phi \leq \psi \tag{215}$$

We can also write it as for $\alpha \neq 0$-

$$0 \leq \phi \leq \frac{\psi}{\alpha} \tag{216}$$

Or

$$0 \leq \phi \leq \phi' \tag{217}$$

2.15. Temperature During Inflations and Deflations

From my 5th paper [5] and equation (99) combined with equation (27), we get-

$$\Delta\phi = \frac{E - \psi_p \phi}{\alpha\phi} \tag{218}$$

And

$$T = \text{þ}\frac{\Delta F_i . \Delta\alpha_s}{\eta_s . \Delta\phi_i} \tag{219}$$

Now by making equation (218) for system, we get-

$$\Delta\phi_i = \frac{E_i - \psi_p \phi_i}{\alpha\phi_i} \tag{220}$$

Now by putting $\Delta\phi_i$ value from equation (220) to (219), we get-

$$T = \text{þ}\frac{\Delta F_i . \Delta\alpha_s . \alpha . \phi_i}{\eta_s . (E_s - \psi_p \phi_i)}$$

(221)

Now by taking T in right hand side and $(E_s - \psi_p \phi_i)$ part on left hand side, we get-

$$\pm(E_s - \psi_p \phi_i) = þ\frac{\Delta F_i . \Delta\alpha_s . \alpha . \phi_i}{\eta_s . T} \tag{222}$$

$$\{\because E = \psi\phi \ or \ \psi = \psi_p + \alpha\Delta\phi\}$$
$$E = \psi_p \phi + \alpha\phi\Delta\phi$$

Or

$$\pm\Delta\phi = \frac{E - \psi_p \phi}{\alpha\phi}$$

So, for deflations-

$$\Delta\phi_d = \frac{E - \psi_p \phi}{\alpha\phi} \tag{223}$$

For inflations-

$$\Delta\phi_i = \frac{\psi_p \phi - E}{\alpha\phi} \tag{224}$$

First we calculate equation (222) for deflations-

$$(E_s - \psi_p \phi_i) = þ\frac{\Delta F_i . \Delta\alpha_s . \alpha . \phi_i}{\eta_s . T_d} \tag{225}$$

So

$$E_s = þ\frac{\Delta F_i . \Delta\alpha_s . \alpha . \phi_i}{\eta_s . T_d} + \psi_p \phi_i \tag{226}$$

Now by using Boltzmann's low [7] for thermal energy-

$$E = k_B T \tag{227}$$

So, the equation (226) becomes at maximum transformation state in form of broken parts as-

$$k_B T_d + \psi_p \phi_i = þ\frac{\Delta F_i . \Delta\alpha_s . \alpha . \phi_i}{\eta_s . T_d} + \psi_p \phi_i \tag{228}$$

$$\{\because \psi_p \phi_i \ is \ non - transformable \ Energy\}$$

{Here T_d is temperature for deflations.}

Now by calculating for inflations-

$$(\psi_p \phi_i - E_s) = þ\frac{\Delta F_i . \Delta\alpha_s . \alpha . \phi_i}{\eta_s . T_{in}} \tag{229}$$

$$E_s = \psi_p \phi_i - þ\frac{\Delta F_i . \Delta\alpha_s . \alpha . \phi_i}{\eta_s . T_{in}} \tag{230}$$

So, we can write it as using Boltzmann's law [7]-

$$\psi_p \phi_i - k_B T_{in} = \psi_p \phi_i - þ\frac{\Delta F_i . \Delta\alpha_s . \alpha . \phi_i}{\eta_s . T_{in}} \tag{231}$$

{Here T_{in} is temperature in inflations.}

Now by solving further to equations (228), we get-

$$k_B T_d = þ\frac{\Delta F_i . \Delta\alpha_s . \alpha . \phi_i}{\eta_s . T_d} \tag{232}$$

Now by rearranging equation (232), we get-

$$T_d^2 = þ\frac{\Delta F_i . \Delta\alpha_s . \alpha . \phi_i}{\eta_s . k_B} \tag{233}$$

So, we have got quadratic equation in form of T_d temperature. Now by solving further to equation (231), we get-

$$k_B T_{in} = þ\frac{\Delta F_i . \Delta\alpha_s . \alpha . \phi_i}{\eta_s . T_{in}} \tag{234}$$

Or

$$T_{in}^2 = þ\frac{\Delta F_i . \Delta\alpha_s . \alpha . \phi_i}{\eta_s . k_B}$$

(235)

So, we have got two solutions for each type of temperature T_d and T_{in}-

$$T_d = \pm\sqrt{þ\frac{\Delta F_i.\Delta\alpha_s.\alpha.\phi_i}{\eta_s.k_B}}$$

(236)

$$T_{in} = \pm\sqrt{þ\frac{\Delta F_i.\Delta\alpha_s.\alpha.\phi_i}{\eta_s.k_B}}$$

(237)

So, for inflations and deflations we written energies as-

$$E_s = \psi_p\phi_i - k_B T_{in}$$

(238)

$$E_s = \psi_p\phi_i + k_B T_d$$

(239)

Now we can clearly see from equation (236) and (237) that-

$$|T_d| = |T_{in}| = T^\circ$$

(240)

Here T° is a fundamental quantity of temperature. Now as we know from equation (237), temperature for inflations-

$$T_{in} = \pm T^\circ$$

(241)

Similarly for deflations-

$$T_{in} = \pm T^\circ$$

(242)

For both inflations and deflations, we have-

$$T^\circ = \sqrt{þ\frac{\Delta F_i.\Delta\alpha_s.\alpha.\phi_i}{\eta_s.k_B}}$$

(243)

And

$$\Delta F_i.\Delta\alpha_s \geq 0$$

(244)

Here inequality (244) must hold for temperature not being imaginary for both inflations and deflations.
So, type of ϕ-ψ transformation does not affect temperature quantity. As we know for ϕ-ψ transformation-

$$\Delta\psi = \pm|\alpha\Delta\phi|$$

(245)

And

$$\psi = \psi_p \pm |\alpha\Delta\phi|$$

(246)

From both equations we can find out ϕ-ψ transformation as the difference between whole quantity and perfection quantity of a body as-

$$\psi - \psi_p = \Delta\psi$$

(247)

As we know for inflations-

$$\psi_i = (\psi_p)_i - |\alpha\Delta\phi|$$

(248)

So

$$\psi_i - (\psi_p)_i = -|\alpha\Delta\phi|$$

(249)

$$\Delta\psi_i = -|\alpha\Delta\phi|$$

(250)

Or in other words for inflations there is -ve ϕ-ψ transformations.
As we know for deflations-

$$\psi_d = (\psi_p)_d + |\alpha\Delta\phi|$$

(251)

So

$$\psi_d - (\psi_p)_d = |\alpha\Delta\phi|$$

(252)

Now by putting equation (247) in above equation, we get-

$$\Delta\psi_d = |\alpha\Delta\phi|$$

(253)

So, for inflation there is +ve ϕ-ψ transformations.

We can also write equation (253) as-

$$\Delta\psi_d - |\alpha\Delta\phi| = 0 \tag{254}$$

Or equation (250) can be written as-

$$\Delta\psi_i + |\alpha\Delta\phi| = 0 \tag{255}$$

Here from equation (236) for temperature in deflation not being imaginary, as-

$$þ\frac{\Delta F_i . \Delta\alpha_s . \alpha . \phi_i}{\eta_s . k_B} \geq 0 \tag{256}$$

So, we can write it in form of uncertainty relation as-

$$þ\frac{\alpha . \phi_i}{\eta_s . k_B}(\Delta F_i . \Delta\alpha_s) \geq 0 \tag{257}$$

So, we have got maximum value of T° in deflation, as-

$$þ\frac{\alpha . \phi_i}{\eta_s . k_B}(\Delta F_i . \Delta\alpha_s) \geq T^{\circ} \tag{258}$$

Now by removing negative sign of equation (236) (because of violation of first and second law of thermodynamics as temperature of system can't be negative), we get-

$$T_d = +\sqrt{þ\frac{\Delta F_i . \Delta\alpha_s . \alpha . \phi_i}{\eta_s . k_B}} \tag{259}$$

Or

$$T_d = T^{\circ} \tag{260}$$

Here T° is temperature for deflations.

Now by using equation (238) for temperature in inflations not being imaginary, so-

$$þ\frac{\Delta F_i . \Delta\alpha_s . \alpha . \phi_i}{\eta_s . k_B} \geq 0 \tag{261}$$

So, we can write it in form of uncertainty relation as-

$$þ\frac{\alpha . \phi_i}{\eta_s . k_B}(\Delta F_i . \Delta\alpha_s) \geq 0 \tag{262}$$

So, we have got maximum value of T° in inflations, as-

$$þ\frac{\alpha . \phi_i}{\eta_s . k_B}(\Delta F_i . \Delta\alpha_s) \geq T^{\circ} \tag{263}$$

Now by removing negative sign of equation (237) (because of violation of first and second law of thermodynamics as temperature of system can't be negative), we get-

$$T_{in} = +\sqrt{þ\frac{\Delta F_i . \Delta\alpha_s . \alpha . \phi_i}{\eta_s . k_B}} \tag{264}$$

Or

$$T_{in} = T^{\circ}$$

Now by not going further in details about temperature I intend to go for mathematical representations of various scalar fields from above ideologies about them.

3. Mathematical Representations of Various kinds of Scalar Fields Using Generators of Different Kind

I am starting with some scalar field functions described as ϕ-series with different kind of generators in my former Article [5]-

$$\Phi = (a; \phi)_n \ \forall |\phi| < 1 \ \& \ n \in \mathbb{R} \tag{265}$$

$$\because (a; \phi)_n = (1 - a)(1 - a\phi)(1 - a\phi^2) \ldots (1 - a\phi^{n-1})$$

3.1. Differentiation of Various Scalar Fields

Now by differentiating ϕ-series with respect to universal time (τ)-

$$\frac{\partial \Phi}{\partial \tau}=\frac{\partial}{\partial \tau}(a;\phi)_n=\frac{\partial}{\partial \tau}(1-a).(1-a\phi)(1-a\phi^2)\dots(1-a\phi^{n-1})+(1-a)\frac{\partial}{\partial \tau}(1-a\phi).(1-a\phi^2)\dots(1-a\phi^{n-1})$$
$$+(1-a)(1-a\phi)\frac{\partial}{\partial \tau}(1-a\phi^2)\dots(1-a\phi^{n-1})+\dots+(1-a)(1-a\phi)(1-a\phi^2)\dots\frac{\partial}{\partial \tau}(1-a\phi^{n-1})$$

(266)

If a does not vary with time, then the equation (266) becomes-

$$\left\{\because \frac{\partial}{\partial \tau}(1-a)=0\right\}$$

$$\frac{\partial \Phi}{\partial \tau}=-\left\{0+a\frac{\partial \phi}{\partial \tau}(1-a).(1-a\phi^2)\dots(1-a\phi^{n-1})+2a\phi\frac{\partial \phi}{\partial \tau}(1-a)(1-a\phi)(1-a\phi^3)\dots(1-a\phi^{n-1})\right.$$
$$\left.+3a\phi^2\frac{\partial \phi}{\partial \tau}(1-a)(1-a\phi)(1-a\phi^2)\dots(1-a\phi^{n-1})+\dots+(n-1)a\phi^{n-2}\frac{\partial \phi}{\partial \tau}(1-a)(1-a\phi)(1-a\phi^2)\dots(1-a\phi^{n-2})\right\}$$

(267)

Now by putting $a\frac{\partial \phi}{\partial \tau}$ to outside to the equation (267), we get-

$$\frac{\partial \Phi}{\partial \tau}=-a\frac{\partial \phi}{\partial \tau}\{(1-a).(1-a\phi^2)\dots(1-a\phi^{n-1})+2\phi(1-a)(1-a\phi)(1-a\phi^3)\dots(1-a\phi^{n-1})+3\phi^2(1-a)(1-a\phi)(1-a\phi^2)\dots(1-a\phi^{n-1})$$
$$+\dots+(n-1)\phi^{n-2}(1-a)(1-a\phi)(1-a\phi^2)\dots(1-a\phi^{n-2})\}$$

(268)

Now by putting $(a;\phi)_n$ in equation (268), we get-

$$\frac{\partial \Phi}{\partial \tau}=-a(a;\phi)_n\frac{\partial \phi}{\partial \tau}\left\{\frac{1}{(1-a\phi)}+\frac{2\phi}{(1-a\phi^2)}+\frac{3\phi^2}{(1-a\phi^3)}+\dots+\frac{(n-1)\phi^{n-2}}{(1-a\phi^{n-1})}\right\}$$

(269)

$$\{\because \Phi=(a;\phi)_n\}$$

So, the equation (269) becomes-

$$\frac{\partial \Phi}{\partial \tau}=-a\Phi\frac{\partial \phi}{\partial \tau}\left\{\frac{1}{(1-a\phi)}+\frac{2\phi}{(1-a\phi^2)}+\frac{3\phi^2}{(1-a\phi^3)}+\dots+\frac{(n-1)\phi^{n-2}}{(1-a\phi^{n-1})}\right\}$$

(270)

As we know from my fifth paper [5] the derivative-

$$\frac{\partial \phi}{\partial \tau}=i|\phi_1^2+\phi_2^2|^{1/2}\frac{1}{(1+D^2)}\frac{\partial D}{\partial \tau}.e^{i.\tan^{-1}(D)}+\frac{\phi}{(\phi_1^2+\phi_2^2)}\left(\phi_1\frac{\partial \phi_1}{\partial \tau}+\phi_2\frac{\partial \phi_2}{\partial \tau}\right)$$

(271)

$$for\ \phi=\phi_1+i\phi_2\ \because \phi=|\phi_1^2+\phi_2^2|^{1/2}e^{i.\tan^{-1}(D)}$$

We can also write equation (271) as-

$$\frac{\partial \phi}{\partial \tau}=i\phi\frac{1}{(1+D^2)}\frac{\partial D}{\partial \tau}+\frac{\phi}{(\phi_1^2+\phi_2^2)}\left(\phi_1\frac{\partial \phi_1}{\partial \tau}+\phi_2\frac{\partial \phi_2}{\partial \tau}\right)$$

(272)

So, by putting the value of $\frac{\partial \phi}{\partial \tau}$ from equation (272) in (270), we get-

$$\frac{\partial \Phi}{\partial \tau}=-a\Phi\left[i\phi\frac{1}{(1+D^2)}\frac{\partial D}{\partial \tau}+\frac{\phi}{(\phi_1^2+\phi_2^2)}\left(\phi_1\frac{\partial \phi_1}{\partial \tau}+\phi_2\frac{\partial \phi_2}{\partial \tau}\right)\right]\left\{\frac{1}{(1-a\phi)}+\frac{2\phi}{(1-a\phi^2)}+\frac{3\phi^2}{(1-a\phi^3)}+\dots+\frac{(n-1)\phi^{n-2}}{(1-a\phi^{n-1})}\right\}$$

(273)

We can also write equation (273) as-

$$\frac{1}{\Phi}\frac{\partial \Phi}{\partial \tau}=-a\phi\left[i\frac{1}{(1+D^2)}\frac{\partial D}{\partial \tau}+\frac{1}{(\phi_1^2+\phi_2^2)}\left(\phi_1\frac{\partial \phi_1}{\partial \tau}+\phi_2\frac{\partial \phi_2}{\partial \tau}\right)\right]\left\{\frac{1}{(1-a\phi)}+\frac{2\phi}{(1-a\phi^2)}+\frac{3\phi^2}{(1-a\phi^3)}+\dots+\frac{(n-1)\phi^{n-2}}{(1-a\phi^{n-1})}\right\}$$

(274)

We can also write the common term as series-

$$\sum_{k=1}^{n-1}\frac{k\phi^{k-1}}{(1-a\phi^k)}=\left\{\frac{1}{(1-a\phi)}+\frac{2\phi}{(1-a\phi^2)}+\frac{3\phi^2}{(1-a\phi^3)}+\dots+\frac{(n-1)\phi^{n-2}}{(1-a\phi^{n-1})}\right\}$$

(275)

So, by putting equation (275) in equation (274), we get-

$$\frac{1}{\Phi}\frac{\partial \Phi}{\partial \tau}=-a\phi.\sum_{k=1}^{n-1}\frac{k\phi^{k-1}}{(1-a\phi^k)}\left[i\frac{1}{(1+D^2)}\frac{\partial D}{\partial \tau}+\frac{1}{(\phi_1^2+\phi_2^2)}\left(\phi_1\frac{\partial \phi_1}{\partial \tau}+\phi_2\frac{\partial \phi_2}{\partial \tau}\right)\right]$$

(276)

This calculation was only for n-degree normal scalar field function. Now for other type of scalar field functions like-

$$\Phi=\sum_{n=1}^{\infty}(-1;\phi)_n(-1;\phi^2)_n$$

(277)

Or for positive scalar field functions like-

$$\Phi=(-\phi;\phi^2)_n(-\phi^2;\phi^2)_n\ \ \forall|\phi|<1$$

(278)

Now by differentiating equation (278) with respect to time (τ) as-

$$\frac{\partial\Phi}{\partial\tau} = \frac{\partial}{\partial\tau}(-\phi;\phi^2)_n.(-\phi^2;\phi^2)_n + (-\phi;\phi^2)_n\frac{\partial}{\partial\tau}(-\phi^2;\phi^2)_n \tag{279}$$

$$(-\phi;\phi^2)_n = (1+\phi)(1+\phi^3)(1+\phi^5)\dots(1+\phi^{2n-1}) \tag{280}$$

Or

$$(-\phi^2;\phi^2)_n = (1+\phi^2)(1+\phi^4)(1+\phi^6)\dots(1+\phi^{2n}) \tag{281}$$

So, value of derivatives of equation (280) is-

$$\frac{\partial}{\partial\tau}(-\phi;\phi^2)_n = \left\{\frac{\partial\phi}{\partial\tau}(1+\phi^3)(1+\phi^5)\dots(1+\phi^{2n-1}) + 3\phi^2\frac{\partial\phi}{\partial\tau}(1+\phi)(1+\phi^5)\dots(1+\phi^{2n-1}) + 5\phi^4\frac{\partial\phi}{\partial\tau}(1+\phi)(1+\phi^3)\dots(1+\phi^{2n-1}) + \cdots + (2n-1)\phi^{2n-2}\frac{\partial\phi}{\partial\tau}(1+\phi)(1+\phi^3)(1+\phi^5)\dots(1+\phi^{2n-3})\right\} \tag{282}$$

Now by putting equation 280 in equation 282, we get-

$$\frac{\partial}{\partial\tau}(-\phi;\phi^2)_n = \frac{\partial\phi}{\partial\tau}(-\phi;\phi^2)_n\left\{\frac{1}{(1+\phi)} + \frac{3\phi^2}{(1+\phi^3)} + \frac{5\phi^4}{(1+\phi^5)} + \cdots + \frac{(2n-1)\phi^{2n-2}}{(1+\phi^{2n-1})}\right\} \tag{283}$$

The bracket term can be written as-

$$\sum_{k=0}^{n-1}\frac{(2k+1)\phi^{2k}}{(1-a\phi^{2k+1})} = \left\{\frac{1}{(1+\phi)} + \frac{3\phi^2}{(1+\phi^3)} + \frac{5\phi^4}{(1+\phi^5)} + \cdots + \frac{(2n-1)\phi^{2n-2}}{(1+\phi^{2n-1})}\right\} \tag{284}$$

Now by putting the value of equation (284) in equation (283), we get-

$$\frac{\partial}{\partial\tau}(-\phi;\phi^2)_n = \frac{\partial\phi}{\partial\tau}(-\phi;\phi^2)_n\sum_{k=0}^{n-1}\frac{(2k+1)\phi^{2k}}{(1-a\phi^{2k+1})} \tag{285}$$

Now by differentiating equation (281) similarly, we get-

$$\frac{\partial}{\partial\tau}(-\phi^2;\phi^2)_n = (-\phi^2;\phi^2)_n.\frac{\partial\phi}{\partial\tau}\left\{\frac{2\phi}{(1+\phi^2)} + \frac{4\phi^3}{(1+\phi^4)} + \frac{6\phi^5}{(1+\phi^6)} + \cdots + \frac{2n.\phi^{2n-1}}{(1+\phi^{2n})}\right\} \tag{286}$$

The bracket term in Equation (286) can be written as-

$$\sum_{k=1}^{n}\frac{2k.\phi^{2k-1}}{(1-a\phi^{2k})} = \left\{\frac{2\phi}{(1+\phi^2)} + \frac{4\phi^3}{(1+\phi^4)} + \frac{6\phi^5}{(1+\phi^6)} + \cdots + \frac{2n.\phi^{2n-1}}{(1+\phi^{2n})}\right\} \tag{287}$$

So, we can write equation (286) as-

$$\frac{\partial}{\partial\tau}(-\phi^2;\phi^2)_n = (-\phi^2;\phi^2)_n.\frac{\partial\phi}{\partial\tau}\sum_{k=1}^{n}\frac{2k.\phi^{2k-1}}{(1-a\phi^{2k})} \tag{288}$$

Now by reducing k=0 to k=1 and in equations (285), we get-

$$\frac{\partial}{\partial\tau}(-\phi;\phi^2)_n = \frac{\partial\phi}{\partial\tau}(-\phi;\phi^2)_n\sum_{k=1}^{n}\frac{(2k-1)\phi^{2k-2}}{(1-a\phi^{2k-1})} \tag{289}$$

$$\frac{\partial}{\partial\tau}(-\phi^2;\phi^2)_n = (-\phi^2;\phi^2)_n.\frac{\partial\phi}{\partial\tau}\sum_{k=1}^{n}\frac{2k.\phi^{2k-1}}{(1-a\phi^{2k})} \tag{290}$$

Now by putting value of both derivatives in equation (279) from equation (289) and (290), we get-

$$\frac{\partial\Phi}{\partial\tau} = (-\phi;\phi^2)_n.(-\phi^2;\phi^2)_n.\frac{\partial\phi}{\partial\tau}\left\{\sum_{k=1}^{n}\frac{(2k-1)\phi^{2k-2}}{(1-a\phi^{2k-1})} + \sum_{k=1}^{n}\frac{2k.\phi^{2k-1}}{(1-a\phi^{2k})}\right\} \tag{291}$$

From equation (278) putting the value of Φ in equation (291), we get-

$$\frac{\partial\Phi}{\partial\tau} = \Phi.\frac{\partial\phi}{\partial\tau}\left\{\sum_{k=1}^{n}\frac{(2k-1)\phi^{2k-2}}{(1-a\phi^{2k-1})} + \sum_{k=1}^{n}\frac{2k.\phi^{2k-1}}{(1-a\phi^{2k})}\right\} \tag{292}$$

We can also write it as-

$$\frac{\partial\Phi}{\partial\tau} = \Phi.\frac{\partial\phi}{\partial\tau}\left\{\sum_{k=1}^{n}\frac{(2k-1)\phi^{2k-2}}{(1-a\phi^{2k-1})} + \frac{2k.\phi^{2k-1}}{(1-a\phi^{2k})}\right\} \tag{293}$$

We can write this combination of two series as-

$$\left\{\sum_{k=1}^{n}\frac{(2k-1)\phi^{2k-2}}{(1-a\phi^{2k-1})}+\frac{2k.\phi^{2k-1}}{(1-a\phi^{2k})}\right\}=\left\{\frac{1}{(1+\phi)}+\frac{2\phi}{(1+\phi^2)}+\frac{3\phi^2}{(1+\phi^3)}+\frac{4\phi^3}{(1+\phi^4)}+\frac{5\phi^4}{(1+\phi^5)}+\cdots+\frac{(2n-1)\phi^{2n-2}}{(1+\phi^{2n-1})}+\frac{2n.\phi^{2n-1}}{(1+\phi^{2n})}\right\}=\sum_{k=1}^{2n}\frac{k\phi^{k-1}}{(1+\phi^k)} \tag{294}$$

Now by putting the above solution in equation (293), we get-

$$\frac{\partial\Phi}{\partial\tau}=\Phi.\frac{\partial\phi}{\partial\tau}\sum_{k=1}^{2n}\frac{k\phi^{k-1}}{(1+\phi^k)}$$

$$\frac{1}{\Phi}\frac{\partial\Phi}{\partial\tau}=\frac{\partial\phi}{\partial\tau}\sum_{k=1}^{2n}\frac{k\phi^{k-1}}{(1+\phi^k)} \tag{295}$$

Here evolution is also positive of positive functions with time. Now for negative functions of this type-

$$\Phi=(\phi;\phi^2)_n(\phi^2;\phi^2)_n \tag{296}$$

Here

$$(\phi;\phi^2)_n=(1-\phi)(1-\phi^3)(1-\phi^5)\ldots(1-\phi^{2n-1}) \tag{297}$$

Or

$$(\phi^2;\phi^2)_n=(1-\phi^2)(1-\phi^4)(1-\phi^6)\ldots(1-\phi^{2n}) \tag{298}$$

Now by calculating similarly for $\Phi=(-\phi;\phi^2)_n(-\phi^2;\phi^2)_n$ we get the derivative of equation (296) as-

$$\frac{\partial\Phi}{\partial\tau}=-\Phi.\frac{\partial\phi}{\partial\tau}\sum_{k=1}^{2n}\frac{k\phi^{k-1}}{(1-\phi^k)} \tag{299}$$

Or we can write equation (299) as-

$$\frac{1}{\Phi}\frac{\partial\Phi}{\partial\tau}=-\frac{\partial\phi}{\partial\tau}\sum_{k=1}^{2n}\frac{k\phi^{k-1}}{(1-\phi^k)} \tag{300}$$

So, evolution of negative functions is also negative. Now if the scalar field functions of infinite order like-

$$\Phi=(-\phi;\phi^2)_\infty(\phi;\phi^2)_\infty(-\phi;\phi)_\infty(\phi;\phi)_\infty \tag{301}$$

Using Ramanujana's notebook 3 [11] to solve this kind of identities-

$$(-\phi;\phi^2)_\infty(\phi;\phi^2)_\infty=(\phi^2;\phi^4)_\infty$$

So, we can write equation (301) as-

$$\Phi=(\phi^2;\phi^4)_\infty(-\phi;\phi)_\infty(\phi;\phi)_\infty \tag{302}$$

$$\because(-\phi;\phi)_\infty=\frac{1}{(\phi;\phi^2)_\infty}$$

We can write equation (302) as-

$$\Phi=\frac{(\phi^2;\phi^4)_\infty}{(\phi;\phi^2)_\infty}(\phi;\phi)_\infty \tag{303}$$

$$\because\frac{(\phi^2;\phi^4)_\infty}{(\phi;\phi^2)_\infty}=(-\phi;\phi^2)_\infty$$

So, we can write equation (303) as-

$$\Phi=(-\phi;\phi^2)_\infty(\phi;\phi)_\infty \tag{304}$$

$$\because(\phi;\phi)_\infty=(\phi;\phi^2)_\infty(\phi^2;\phi^2)_\infty$$

So, we can write equation (304) as-

$$\Phi=(-\phi;\phi^2)_\infty(\phi;\phi^2)_\infty(\phi^2;\phi^2)_\infty \tag{305}$$

$$\because(-\phi;\phi^2)_\infty(\phi;\phi^2)_\infty=(\phi^2;\phi^4)_\infty$$

So, the equation (305) can be written as-

$$\Phi=(\phi^2;\phi^2)_\infty(\phi^2;\phi^4)_\infty \tag{306}$$

Now for a simple scalar field with two coefficients in ϕ-Series, we have-

$$\Phi=(a;b\phi)_n \tag{307}$$

$$\because (a;b\phi)_n = (1-a)(1-ab\phi)(1-ab^2\phi^2)\dots(1-ab^{n-1}\phi^{n-1})$$

Now by differentiating equation (307) with respect to τ, we get-

$$\frac{\partial \Phi}{\partial \tau} = \frac{\partial}{\partial \tau}(a;b\phi)_n = -\Phi\frac{\partial \phi}{\partial \tau}\left\{\frac{ab}{(1-ab\phi)} + \frac{ab^2}{(1-ab^2\phi^2)} + \dots + \frac{(n-1)ab^{n-1}\phi^{n-2}}{(1-ab^{n-1}\phi^{n-1})}\right\} \tag{308}$$

Now by taking a out of the bracket, we get-

$$\frac{\partial \Phi}{\partial \tau} = -a\Phi\frac{\partial \phi}{\partial \tau}\left\{\frac{b}{(1-ab\phi)} + \frac{b^2}{(1-ab^2\phi^2)} + \dots + \frac{(n-1)b^{n-1}\phi^{n-2}}{(1-ab^{n-1}\phi^{n-1})}\right\} \tag{309}$$

The bracket term in equation above can be written as-

$$\sum_{k=1}^{n-1}\frac{kb^k\phi^{k-1}}{(1-ab^k\phi^k)} = \left\{\frac{b}{(1-ab\phi)} + \frac{b^2}{(1-ab^2\phi^2)} + \dots + \frac{(n-1)b^{n-1}\phi^{n-2}}{(1-ab^{n-1}\phi^{n-1})}\right\} \tag{310}$$

Now by putting equation (310) in equation (309), we get-

$$\frac{\partial \Phi}{\partial \tau} = -a\Phi\frac{\partial \phi}{\partial \tau}\sum_{k=1}^{n-1}\frac{kb^k\phi^{k-1}}{(1-ab^k\phi^k)} \tag{311}$$

Equation (311) can be written as-

$$\frac{1}{\Phi}\frac{\partial \Phi}{\partial \tau} = -a\frac{\partial \phi}{\partial \tau}\sum_{k=1}^{n-1}\frac{kb^k\phi^{k-1}}{(1-ab^k\phi^k)} \tag{312}$$

This is valid for a and b we are constant with time. As we know from equation (10) that-

$$\Phi_u^{\circ} = \sum_{n=-\infty}^{\infty}(\phi;\phi)_n(\phi^\dagger;\phi^\dagger)_n(-\phi;\phi)_n(-\phi^\dagger;\phi^\dagger)_n \tag{313}$$

Now by differentiating equation (313) with respect to universal time (τ)-

$$\frac{\partial \Phi_u^{\circ}}{\partial \tau} = \sum_{n=-\infty}^{\infty}\left\{\frac{\partial}{\partial \tau}(\phi;\phi)_n(\phi^\dagger;\phi^\dagger)_n(-\phi;\phi)_n(-\phi^\dagger;\phi^\dagger)_n + (\phi;\phi)_n\frac{\partial}{\partial \tau}(\phi^\dagger;\phi^\dagger)_n(-\phi;\phi)_n(-\phi^\dagger;\phi^\dagger)_n + (\phi;\phi)_n(\phi^\dagger;\phi^\dagger)_n\frac{\partial}{\partial \tau}(-\phi;\phi)_n(-\phi^\dagger;\phi^\dagger)_n + (\phi;\phi)_n(\phi^\dagger;\phi^\dagger)_n(-\phi;\phi)_n\frac{\partial}{\partial \tau}(-\phi^\dagger;\phi^\dagger)_n\right\} \tag{314}$$

$$\because (\phi;\phi)_n = (1-\phi)(1-\phi^2)\dots(1-\phi^n) \tag{315}$$

Here $\phi = \phi_1 + i\phi_2$ & $\phi^\dagger = \phi_1 - i\phi_2$ or $|\phi| = |\phi^\dagger| < 1$

Now by differentiating equation (315) with respect to τ, we get-

$$\frac{\partial}{\partial \tau}(\phi;\phi)_n = -(\phi;\phi)_n\frac{\partial \phi}{\partial \tau}\left\{\frac{1}{(1-\phi)} + \frac{2\phi}{(1-\phi^2)} + \dots + \frac{n\phi^{n-1}}{(1-\phi^n)}\right\} \tag{316}$$

We can write bracket term in equation (316) as-

$$\sum_{k=1}^{n}\frac{k\phi^{k-1}}{(1-\phi^k)} = \left\{\frac{1}{(1-\phi)} + \frac{2\phi}{(1-\phi^2)} + \dots + \frac{n\phi^{n-1}}{(1-\phi^n)}\right\} \tag{317}$$

Now by putting equation (317) in equation (316), we get-

$$\frac{\partial}{\partial \tau}(\phi;\phi)_n = -(\phi;\phi)_n\frac{\partial \phi}{\partial \tau}\sum_{k=1}^{n}\frac{k\phi^{k-1}}{(1-\phi^k)} \tag{318}$$

In similar way, we get-

$$\frac{\partial}{\partial \tau}(-\phi;\phi)_n = (-\phi;\phi)_n\frac{\partial \phi}{\partial \tau}\sum_{k=1}^{n}\frac{k\phi^{k-1}}{(1+\phi^k)} \tag{319}$$

$$\frac{\partial}{\partial \tau}(\phi^\dagger;\phi^\dagger)_n = -(\phi^\dagger;\phi^\dagger)_n\frac{\partial \phi^\dagger}{\partial \tau}\sum_{k=1}^{n}\frac{k{\phi^\dagger}^{k-1}}{(1-{\phi^\dagger}^k)} \tag{320}$$

$$\frac{\partial}{\partial \tau}(-\phi^\dagger;\phi^\dagger)_n = (-\phi^\dagger;\phi^\dagger)_n\frac{\partial \phi^\dagger}{\partial \tau}\sum_{k=1}^{n}\frac{k{\phi^\dagger}^{k-1}}{(1+{\phi^\dagger}^k)} \tag{321}$$

Now I am putting the values of these derivatives in equation (314) from equation (318), (319), (320) and (321), we get-

$$\frac{\partial \Phi_u^{\circ}}{\partial \tau}=\sum_{n=-\infty}^{\infty}(\phi;\phi)_n(\phi^{\dagger};\phi^{\dagger})_n(-\phi;\phi)_n(-\phi^{\dagger};\phi^{\dagger})_n\left\{-\frac{\partial \phi}{\partial \tau}\sum_{k=1}^{n}\frac{k\phi^{k-1}}{(1-\phi^k)}+\frac{\partial \phi}{\partial \tau}\sum_{k=1}^{n}\frac{k\phi^{k-1}}{(1+\phi^k)}-\frac{\partial \phi^{\dagger}}{\partial \tau}\sum_{k=1}^{n}\frac{k{\phi^{\dagger}}^{k-1}}{\left(1-{\phi^{\dagger}}^{k}\right)}+\frac{\partial \phi^{\dagger}}{\partial \tau}\sum_{k=1}^{n}\frac{k{\phi^{\dagger}}^{k-1}}{\left(1+{\phi^{\dagger}}^{k}\right)}\right\} \tag{322}$$

We can write equation (322) by dividing series in two parts as-

$$\frac{\partial \Phi_u^{\circ}}{\partial \tau}=\sum_{n=-\infty}^{\infty}(\phi;\phi)_n(\phi^{\dagger};\phi^{\dagger})_n(-\phi;\phi)_n(-\phi^{\dagger};\phi^{\dagger})_n\sum_{n=-\infty}^{\infty}\left\{-\frac{\partial \phi}{\partial \tau}\sum_{k=1}^{n}\frac{k\phi^{k-1}}{(1-\phi^k)}+\frac{\partial \phi}{\partial \tau}\sum_{k=1}^{n}\frac{k\phi^{k-1}}{(1+\phi^k)}-\frac{\partial \phi^{\dagger}}{\partial \tau}\sum_{k=1}^{n}\frac{k{\phi^{\dagger}}^{k-1}}{\left(1-{\phi^{\dagger}}^{k}\right)}+\frac{\partial \phi^{\dagger}}{\partial \tau}\sum_{k=1}^{n}\frac{k{\phi^{\dagger}}^{k-1}}{\left(1+{\phi^{\dagger}}^{k}\right)}\right\} \tag{323}$$

Now by using equation (313), we have equation (323) as-

$$\frac{\partial \Phi_u^{\circ}}{\partial \tau}=\Phi_u^{\circ}\sum_{n=-\infty}^{\infty}\left\{\frac{\partial \phi}{\partial \tau}\left(\sum_{k=1}^{n}\frac{k\phi^{k-1}}{(1+\phi^k)}-\sum_{k=1}^{n}\frac{k\phi^{k-1}}{(1-\phi^k)}\right)+\frac{\partial \phi^{\dagger}}{\partial \tau}\left(\sum_{k=1}^{n}\frac{k{\phi^{\dagger}}^{k-1}}{\left(1+{\phi^{\dagger}}^{k}\right)}-\sum_{k=1}^{n}\frac{k{\phi^{\dagger}}^{k-1}}{\left(1-{\phi^{\dagger}}^{k}\right)}\right)\right\} \tag{324}$$

Now by using some relations in q-series we can get equation (313) as-

$$\because (-\phi;\phi)_\infty=\frac{1}{(\phi;\phi^2)_\infty}$$

$$\Phi_u^{\circ}=\sum_{\lim (n)\to-\infty}^{\lim (n)\to\infty}(\phi;\phi)_n(\phi^{\dagger};\phi^{\dagger})_n(-\phi;\phi)_n(-\phi^{\dagger};\phi^{\dagger})_n+\frac{(\phi;\phi)_\infty(\phi^{\dagger};\phi^{\dagger})_\infty}{(\phi;\phi^2)_\infty\left(\phi^{\dagger};{\phi^{\dagger}}^2\right)_\infty} \tag{325}$$

Now I intend to explain which kind of scalar fields are responsible for formation of stable central systems and which kind of skilled fields are responsible for expansion of universe? The answer lies in mode of these scalar field functions.

$$if\begin{cases}|\Phi|<1\; stable\ central\ system\\ |\Phi|>1\; expension\ of\ universe\\ |\Phi|\to\infty\; Universal\ dynamical\ scalar\ field\\ |\Phi|\to 0\; Perfect\ Body\ Scalar\ field\ (hignly\ stable)\end{cases}$$

So, -ve ϕ-series containing scalar fields are stable central systems, because-

$$|\Phi|<1 \tag{326}$$

Let's take a –ve Φ function-

$$\Phi=(\phi;\phi)_n=(1-\phi)(1-\phi^2)\dots(1-\phi^n) \tag{327}$$

Taking mode of Φ -

$$|\Phi|=|(\phi;\phi)_n|=|(1-\phi)(1-\phi^2)\dots(1-\phi^n)| \tag{328}$$

$\because |\phi|<1\ so\ |(1-\phi)|<1$

Multiplication of n number and each number is between 0 and 1, and then the multiplication will also belong to interval (0, 1). So, we can say for equation (328) $|\Phi|<1$. So, series like equation (327) are responsible for formation of stable central systems. Now the second condition $|\Phi|$ >1 holds for positive $\phi\ series$

$$\Phi=(-\phi;\phi)_n=(1+\phi)(1+\phi^2)\dots(1+\phi^n) \tag{329}$$

Now by taking mode of equation (329) $|\phi|<1$, we get-

$$|\Phi|=|(-\phi;\phi)_n|=|(1+\phi)(1+\phi^2)\dots(1+\phi^n)| \tag{330}$$

$$\because |\phi|<1, |1+\phi|>1\ and\ |1+\phi^n|\to 1$$

So, the outcome of multiplication of all number like in interval (1,2) will be greater than 1. So, we can say for equation (330) $|\Phi|>1$. So, series like equation (329) are responsible for expansion of universe.

Now for $|\Phi|\to 0$, we have series like-

$$\Phi=(a;\phi)_n=(1-a)(1-a\phi)(1-a\phi^2)\dots(1-a\phi^{n-1}) \tag{331}$$

Here $|a|\to 1$, $|\Phi|<1$ and $a+h=1\ or\ \lim h\to 0$

Now by taking mode of equation (331), we get-

$$|\Phi|=|(a;\phi)_n|=|(1-a)(1-a\phi)(1-a\phi^2)\dots(1-a\phi^{n-1})| \tag{332}$$

So for $|a|\to 1$ $|1-a|\to 0$

So, we can say any number in a multiplication tend to zero lead whole multiplication to zero. So, for equation (332), we can say $|\Phi|\to 0$. This kind of initial boundary is for scalar field of perfect body generators also non-interacting for perfect body.

Let's take an infinite order ϕ-Series-

$$\Phi = (-\phi;\phi)_\infty = (1+\phi)(1-a\phi^2)\dots\dots\infty \tag{333}$$

So, $|\Phi| \to \infty$ for equation (333). These are universal kind of scalar fields. Now from equation (121)-

$$\Phi_M^\circ = \sum_{n=-\infty}^{\infty}(a;\phi)_n(b;\phi^\dagger)_n(c;\phi\phi\phi)_n(d;\phi^\dagger\phi^\dagger\phi^\dagger)_n\,(e;\phi\phi^\dagger\phi)_n(f;\phi^\dagger\phi\phi^\dagger)_n \tag{334}$$

Here a, b, c, d, e and f are some complex or real numbers depending on epochs of universe. For inflation a, b, c, d, e and f are ϕ-series numbers or we can take Φ_M° as-

$$(\Phi_M^\circ)_i = \sum_{n=-\infty}^{\infty}(-a;\phi)_n(-b;\phi^\dagger)_n(-c;\phi\phi\phi)_n(-d;\phi^\dagger\phi^\dagger\phi^\dagger)_n\,(-e;\phi\phi^\dagger\phi)_n(-f;\phi^\dagger\phi\phi^\dagger)_n \tag{335}$$

For $a, b, c, d, e\,, f \in \mathbb{R}\,\&\, C$

For deflations equation (334) can be written as same as-

$$(\Phi_M^\circ)_d = \sum_{n=-\infty}^{\infty}(a;\phi)_n(b;\phi^\dagger)_n(c;\phi\phi\phi)_n(d;\phi^\dagger\phi^\dagger\phi^\dagger)_n\,(-e;\phi\phi^\dagger\phi)_n(-f;\phi^\dagger\phi\phi^\dagger)_n \tag{336}$$

Now by differentiating equation (336) with respect to time (τ), we get-

$$\frac{\partial(\Phi_M^\circ)_d}{\partial\tau} = \frac{\partial}{\partial\tau}\sum_{n=-\infty}^{\infty}(a;\phi)_n(b;\phi^\dagger)_n(c;\phi\phi\phi)_n(d;\phi^\dagger\phi^\dagger\phi^\dagger)_n\,(-e;\phi\phi^\dagger\phi)_n(-f;\phi^\dagger\phi\phi^\dagger)_n \tag{337}$$

$$\because\ (e;\phi\phi^\dagger\phi)_n = (1-e)(1-e\phi\phi^\dagger\phi)\left(1-e\phi^2{\phi^\dagger}^2\phi^2\right)\dots\left(1-e\phi^{n-1}{\phi^\dagger}^{n-1}\phi^{n-1}\right) \tag{338}$$

Now by differentiating equation (338) with respect to time, we get-

$$\begin{aligned}\frac{\partial}{\partial\tau}(e;\phi\phi^\dagger\phi)_n = -e\Bigg[&\frac{\partial\phi}{\partial\tau}\left\{\frac{\phi\phi^\dagger}{(1-e\phi\phi\phi^\dagger)} + \frac{2\phi\phi^2{\phi^\dagger}^2}{\left(1-e\phi^2{\phi^\dagger}^2\phi^2\right)} + \dots + \frac{(n-1)\phi^{n-2}{\phi^\dagger}^{n-1}\phi^{n-1}}{\left(1-e\phi^{n-1}{\phi^\dagger}^{n-1}\phi^{n-1}\right)}\right\}\\ &+ \frac{\partial\phi^\dagger}{\partial\tau}\left\{\frac{\phi\phi}{(1-e\phi\phi\phi^\dagger)} + \frac{2\phi^2\phi^2{\phi^\dagger}^1}{\left(1-e\phi^2{\phi^\dagger}^2\phi^2\right)} + \dots + \frac{(n-1)\phi^{n-1}{\phi^\dagger}^{n-2}\phi^{n-1}}{\left(1-e\phi^{n-1}{\phi^\dagger}^{n-1}\phi^{n-1}\right)}\right\}\\ &+ \frac{\partial\phi}{\partial\tau}\left\{\frac{\phi\phi^\dagger}{(1-e\phi\phi\phi^\dagger)} + \frac{2\phi\phi^2{\phi^\dagger}^2}{\left(1-e\phi^2{\phi^\dagger}^2\phi^2\right)} + \dots + \frac{(n-1)\phi^{n-2}{\phi^\dagger}^{n-1}\phi^{n-1}}{\left(1-e\phi^{n-1}{\phi^\dagger}^{n-1}\phi^{n-1}\right)}\right\}\Bigg]\end{aligned} \tag{339}$$

Now by using this relation we find that bracket 1 and 3 in equations (339) are of same kind, so we can write these as-

$$\sum_{k=1}^{n-1}\frac{k{\phi^\dagger}^k\phi^{2k-1}}{\left(1-e\phi^k{\phi^\dagger}^k\phi^k\right)} = \left\{\frac{\phi\phi^\dagger}{(1-e\phi\phi\phi^\dagger)} + \frac{2\phi\phi^2{\phi^\dagger}^2}{\left(1-e\phi^2{\phi^\dagger}^2\phi^2\right)} + \dots + \frac{(n-1)\phi^{n-2}{\phi^\dagger}^{n-1}\phi^{n-1}}{\left(1-e\phi^{n-1}{\phi^\dagger}^{n-1}\phi^{n-1}\right)}\right\} \tag{340}$$

So, we can write derivative (339) as-

$$\frac{\partial}{\partial\tau}(e;\phi\phi^\dagger\phi)_n = -e\left\{2\frac{\partial\phi}{\partial\tau}\sum_{k=1}^{n-1}\frac{k{\phi^\dagger}^k\phi^{2k-1}}{\left(1-e\phi^k{\phi^\dagger}^k\phi^k\right)} + \frac{\partial\phi^\dagger}{\partial\tau}\sum_{k=1}^{n-1}\frac{k{\phi^\dagger}^{k-1}\phi^{2k}}{\left(1-e\phi^k{\phi^\dagger}^k\phi^k\right)}\right\} \tag{341}$$

Now by using similar technique as in equation (322) or equation (275), we get equation (337) as-

$$\begin{aligned}\frac{\partial(\Phi_M^\circ)_d}{\partial\tau} = -\sum_{n=-\infty}^{\infty}&(a;\phi)_n(b;\phi^\dagger)_n(c;\phi\phi\phi)_n(d;\phi^\dagger\phi^\dagger\phi^\dagger)_n\,(e;\phi\phi^\dagger\phi)_n(f;\phi^\dagger\phi\phi^\dagger)_n\sum_{n=-\infty}^{\infty}\Bigg[a\frac{\partial\phi}{\partial\tau}\sum_{k=1}^{n-1}\frac{k\phi^{k-1}}{(1-a\phi^k)}\\ &+ b\frac{\partial\phi^\dagger}{\partial\tau}\sum_{k=1}^{n-1}\frac{k{\phi^\dagger}^{k-1}}{\left(1-a{\phi^\dagger}^k\right)}\\ &+ 3c\frac{\partial\phi}{\partial\tau}\sum_{k=1}^{n-1}\frac{k\phi^{3k-1}}{(1-a\phi^{3k})} + 3d\sum_{k=1}^{n-1}\frac{k{\phi^\dagger}^{3k-1}}{\left(1-d{\phi^\dagger}^{3k}\right)} + e\left\{2\frac{\partial\phi}{\partial\tau}\sum_{k=1}^{n-1}\frac{k{\phi^\dagger}^k\phi^{2k-1}}{\left(1-e\phi^k{\phi^\dagger}^k\phi^k\right)} + \frac{\partial\phi^\dagger}{\partial\tau}\sum_{k=1}^{n-1}\frac{k{\phi^\dagger}^{k-1}\phi^{2k}}{\left(1-e\phi^k{\phi^\dagger}^k\phi^k\right)}\right\}\\ &+ f\left\{2\frac{\partial\phi^\dagger}{\partial\tau}\sum_{k=1}^{n-1}\frac{k{\phi^\dagger}^{2k-1}\phi^k}{\left(1-f{\phi^\dagger}^k\phi^k{\phi^\dagger}^k\right)} + \frac{\partial\phi}{\partial\tau}\sum_{k=1}^{n-1}\frac{k{\phi^\dagger}^{2k}\phi^{k-1}}{\left(1-f{\phi^\dagger}^k\phi^k{\phi^\dagger}^k\right)}\right\}\Bigg]\end{aligned} \tag{342}$$

Now from equations (335) and (336), we can find equation (342) as-

$$\begin{aligned}\frac{1}{\Phi_M^{\circ}}\frac{\partial \Phi_M^{\circ}}{\partial \tau} = \pm \sum_{n=-\infty}^{\infty}\Bigg[& a\frac{\partial \phi}{\partial \tau}\sum_{k=1}^{n-1}\frac{k\phi^{k-1}}{(1\pm a\phi^{k})} \\ & + b\frac{\partial \phi^{\dagger}}{\partial \tau}\sum_{k=1}^{n-1}\frac{k{\phi^{\dagger}}^{k-1}}{\left(1\pm a{\phi^{\dagger}}^{k}\right)} \\ & + 3c\frac{\partial \phi}{\partial \tau}\sum_{k=1}^{n-1}\frac{k\phi^{3k-1}}{(1\pm a\phi^{3k})} + 3d\sum_{k=1}^{n-1}\frac{k{\phi^{\dagger}}^{3k-1}}{\left(1\pm d{\phi^{\dagger}}^{3k}\right)} + e\left\{2\frac{\partial \phi}{\partial \tau}\sum_{k=1}^{n-1}\frac{k{\phi^{\dagger}}^{k}\phi^{2k-1}}{\left(1\pm e\phi^{k}{\phi^{\dagger}}^{k}\phi^{k}\right)} + \frac{\partial \phi^{\dagger}}{\partial \tau}\sum_{k=1}^{n-1}\frac{k{\phi^{\dagger}}^{k-1}\phi^{2k}}{\left(1\pm e\phi^{k}{\phi^{\dagger}}^{k}\phi^{k}\right)}\right\} \\ & + f\left\{2\frac{\partial \phi^{\dagger}}{\partial \tau}\sum_{k=1}^{n-1}\frac{k{\phi^{\dagger}}^{2k-1}\phi^{k}}{\left(1\pm f{\phi^{\dagger}}^{k}\phi^{k}{\phi^{\dagger}}^{k}\right)} + \frac{\partial \phi}{\partial \tau}\sum_{k=1}^{n-1}\frac{k{\phi^{\dagger}}^{2k}\phi^{k-1}}{\left(1\pm f{\phi^{\dagger}}^{k}\phi^{k}{\phi^{\dagger}}^{k}\right)}\right\}\Bigg]\end{aligned} \tag{342}$$

Here positive sign in equation (342) is for inflations and negative sign is for deflations. So, for inflations-

$$\begin{aligned}\frac{1}{(\Phi_M^{\circ})_i}\frac{\partial (\Phi_M^{\circ})_i}{\partial \tau} = \sum_{n=-\infty}^{\infty}\Bigg[& a\frac{\partial \phi}{\partial \tau}\sum_{k=1}^{n-1}\frac{k\phi^{k-1}}{(1+ a\phi^{k})} \\ & + b\frac{\partial \phi^{\dagger}}{\partial \tau}\sum_{k=1}^{n-1}\frac{k{\phi^{\dagger}}^{k-1}}{\left(1+ a{\phi^{\dagger}}^{k}\right)} \\ & + 3c\frac{\partial \phi}{\partial \tau}\sum_{k=1}^{n-1}\frac{k\phi^{3k-1}}{(1+ a\phi^{3k})} + 3d\sum_{k=1}^{n-1}\frac{k{\phi^{\dagger}}^{3k-1}}{\left(1+ d{\phi^{\dagger}}^{3k}\right)} + e\left\{2\frac{\partial \phi}{\partial \tau}\sum_{k=1}^{n-1}\frac{k{\phi^{\dagger}}^{k}\phi^{2k-1}}{\left(1+ e\phi^{k}{\phi^{\dagger}}^{k}\phi^{k}\right)} + \frac{\partial \phi^{\dagger}}{\partial \tau}\sum_{k=1}^{n-1}\frac{k{\phi^{\dagger}}^{k-1}\phi^{2k}}{\left(1+ e\phi^{k}{\phi^{\dagger}}^{k}\phi^{k}\right)}\right\} \\ & + f\left\{2\frac{\partial \phi^{\dagger}}{\partial \tau}\sum_{k=1}^{n-1}\frac{k{\phi^{\dagger}}^{2k-1}\phi^{k}}{\left(1+ f{\phi^{\dagger}}^{k}\phi^{k}{\phi^{\dagger}}^{k}\right)} + \frac{\partial \phi}{\partial \tau}\sum_{k=1}^{n-1}\frac{k{\phi^{\dagger}}^{2k}\phi^{k-1}}{\left(1+ f{\phi^{\dagger}}^{k}\phi^{k}{\phi^{\dagger}}^{k}\right)}\right\}\Bigg]\end{aligned} \tag{343}$$

Now for deflations-

$$\begin{aligned}\frac{1}{(\Phi_M^{\circ})_d}\frac{\partial (\Phi_M^{\circ})_d}{\partial \tau} = -\sum_{n=-\infty}^{\infty}\Bigg[& a\frac{\partial \phi}{\partial \tau}\sum_{k=1}^{n-1}\frac{k\phi^{k-1}}{(1- a\phi^{k})} \\ & + b\frac{\partial \phi^{\dagger}}{\partial \tau}\sum_{k=1}^{n-1}\frac{k{\phi^{\dagger}}^{k-1}}{\left(1- a{\phi^{\dagger}}^{k}\right)} \\ & + 3c\frac{\partial \phi}{\partial \tau}\sum_{k=1}^{n-1}\frac{k\phi^{3k-1}}{(1- a\phi^{3k})} + 3d\sum_{k=1}^{n-1}\frac{k{\phi^{\dagger}}^{3k-1}}{\left(1- d{\phi^{\dagger}}^{3k}\right)} + e\left\{2\frac{\partial \phi}{\partial \tau}\sum_{k=1}^{n-1}\frac{k{\phi^{\dagger}}^{k}\phi^{2k-1}}{\left(1- e\phi^{k}{\phi^{\dagger}}^{k}\phi^{k}\right)} + \frac{\partial \phi^{\dagger}}{\partial \tau}\sum_{k=1}^{n-1}\frac{k{\phi^{\dagger}}^{k-1}\phi^{2k}}{\left(1- e\phi^{k}{\phi^{\dagger}}^{k}\phi^{k}\right)}\right\} \\ & + f\left\{2\frac{\partial \phi^{\dagger}}{\partial \tau}\sum_{k=1}^{n-1}\frac{k{\phi^{\dagger}}^{2k-1}\phi^{k}}{\left(1- f{\phi^{\dagger}}^{k}\phi^{k}{\phi^{\dagger}}^{k}\right)} + \frac{\partial \phi}{\partial \tau}\sum_{k=1}^{n-1}\frac{k{\phi^{\dagger}}^{2k}\phi^{k-1}}{\left(1- f{\phi^{\dagger}}^{k}\phi^{k}{\phi^{\dagger}}^{k}\right)}\right\}\Bigg]\end{aligned} \tag{344}$$

Here negative sign represents negative evolution of Φ_M° during deflations. So, we can represent about terms in geometrical representation of N-time inflationary diagram of universe as-

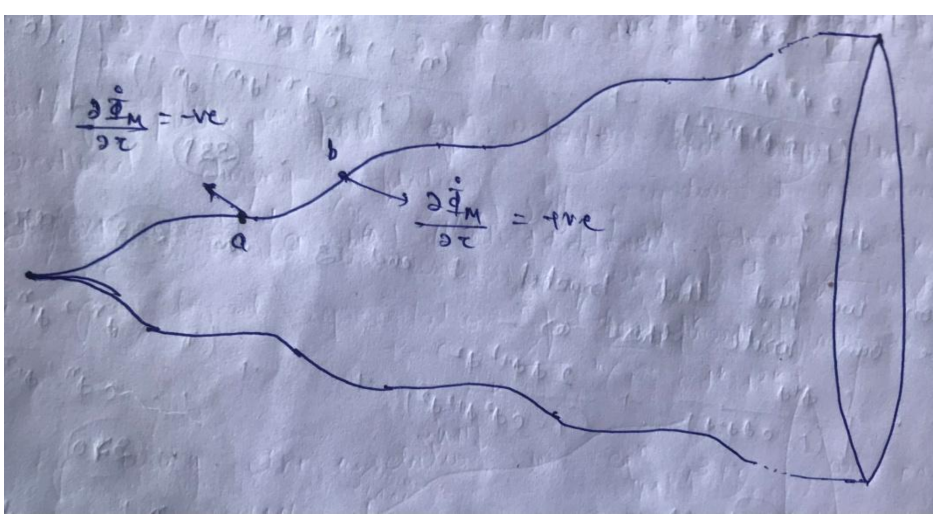


Fig. 16 –Evolution of Φ_M° in Inflations and Deflations of Universe

Now a beautiful fact comes out from my former paper [5], we know that motion of a body can be written as-

$$\vec{F} = (\psi_p + \alpha'\Delta\phi).\frac{\partial \phi'}{\partial \tau}\hat{F}_{act.} + (\psi_p + \alpha_u\Delta\phi).\frac{\partial \Phi_u}{\partial \tau}\hat{F}_{uni.}$$

(345)

As we know from over former Analysis that Φ_M° is a universal function which governs the dynamics of space time as-

$$\Phi_u^{\circ} = \Phi_S^{\circ} S^{\circ} + \Phi_L^{\circ} L^{\circ} + \Phi_M^{\circ} M^{\circ} \tag{346}$$

But these both components Φ_S° & Φ_L° are included in the remained scalar field of body and responsible for actual motion of body. So, we can say-

$$\phi' = (\Phi_S^{\circ} \otimes \Phi_L^{\circ}) \tag{347}$$

So, we can write approximately Φ_u as-

$$\Phi_u \cong \Phi_M^{\circ} \tag{348}$$

Now by using above approximation to compute universal motion in equation (345), we get-

$$\vec{F} = (\psi_p + \alpha'\Delta\phi).\frac{\partial \phi'}{\partial \tau}\hat{F}_{act.} + (\psi_p + \alpha_u\Delta\phi).\frac{\partial \Phi_M^{\circ}}{\partial \tau}\hat{F}_{uni.} \tag{349}$$

Now we know from above geometrical representation that $\frac{\partial \Phi_M^{\circ}}{\partial \tau}$ is negative during deflations and positive during inflations.

So, during deflation universe oppose the motion of a particular body. Now by putting equation (344) for deflations in equation (349), we get-

$$\begin{aligned}\vec{F}_d = (\psi_p + \alpha'\Delta\phi).\frac{\partial \phi'}{\partial \tau}\hat{F}_{act.} - (\psi_p \\ + \alpha_u\Delta\phi)(\Phi_M^{\circ})_d \sum_{n=-\infty}^{\infty}\Bigg[a\frac{\partial\phi}{\partial\tau}\sum_{k=1}^{n-1}\frac{k\phi^{k-1}}{(1-a\phi^k)} \\ + b\frac{\partial\phi^{\dagger}}{\partial\tau}\sum_{k=1}^{n-1}\frac{k{\phi^{\dagger}}^{k-1}}{(1-a{\phi^{\dagger}}^{k})} \\ + 3c\frac{\partial\phi}{\partial\tau}\sum_{k=1}^{n-1}\frac{k\phi^{3k-1}}{(1-a\phi^{3k})} + 3d\sum_{k=1}^{n-1}\frac{k{\phi^{\dagger}}^{3k-1}}{(1-d{\phi^{\dagger}}^{3k})} + e\left\{2\frac{\partial\phi}{\partial\tau}\sum_{k=1}^{n-1}\frac{k{\phi^{\dagger}}^{k}\phi^{2k-1}}{(1-e\phi^k{\phi^{\dagger}}^{k}\phi^k)} + \frac{\partial\phi^{\dagger}}{\partial\tau}\sum_{k=1}^{n-1}\frac{k{\phi^{\dagger}}^{k-1}\phi^{2k}}{(1-e\phi^k{\phi^{\dagger}}^{k}\phi^k)}\right\} \\ + f\left\{2\frac{\partial\phi^{\dagger}}{\partial\tau}\sum_{k=1}^{n-1}\frac{k{\phi^{\dagger}}^{2k-1}\phi^k}{(1-f{\phi^{\dagger}}^{k}\phi^k{\phi^{\dagger}}^{k})} + \frac{\partial\phi}{\partial\tau}\sum_{k=1}^{n-1}\frac{k{\phi^{\dagger}}^{2k}\phi^{k-1}}{(1-f{\phi^{\dagger}}^{k}\phi^k{\phi^{\dagger}}^{k})}\right\}\Bigg]\hat{F}_{uni.}\end{aligned} \tag{350}$$

So, the motion reduced during deflation by universe in bodies but during inflations universe increases the motion of bodies. Now by putting equation (343) in equations (349), we get motion of a particular body in inflations as-

$$\begin{aligned}\vec{F}_i = (\psi_p + \alpha'\Delta\phi).\frac{\partial \phi'}{\partial \tau}\hat{F}_{act.} + (\psi_p \\ + \alpha_u\Delta\phi)(\Phi_M^{\circ})_i \sum_{n=-\infty}^{\infty}\Bigg[a\frac{\partial\phi}{\partial\tau}\sum_{k=1}^{n-1}\frac{k\phi^{k-1}}{(1+a\phi^k)} \\ + b\frac{\partial\phi^{\dagger}}{\partial\tau}\sum_{k=1}^{n-1}\frac{k{\phi^{\dagger}}^{k-1}}{(1+a{\phi^{\dagger}}^{k})} \\ + 3c\frac{\partial\phi}{\partial\tau}\sum_{k=1}^{n-1}\frac{k\phi^{3k-1}}{(1+a\phi^{3k})} + 3d\sum_{k=1}^{n-1}\frac{k{\phi^{\dagger}}^{3k-1}}{(1+d{\phi^{\dagger}}^{3k})} + e\left\{2\frac{\partial\phi}{\partial\tau}\sum_{k=1}^{n-1}\frac{k{\phi^{\dagger}}^{k}\phi^{2k-1}}{(1+e\phi^k{\phi^{\dagger}}^{k}\phi^k)} + \frac{\partial\phi^{\dagger}}{\partial\tau}\sum_{k=1}^{n-1}\frac{k{\phi^{\dagger}}^{k-1}\phi^{2k}}{(1+e\phi^k{\phi^{\dagger}}^{k}\phi^k)}\right\} \\ + f\left\{2\frac{\partial\phi^{\dagger}}{\partial\tau}\sum_{k=1}^{n-1}\frac{k{\phi^{\dagger}}^{2k-1}\phi^k}{(1+f{\phi^{\dagger}}^{k}\phi^k{\phi^{\dagger}}^{k})} + \frac{\partial\phi}{\partial\tau}\sum_{k=1}^{n-1}\frac{k{\phi^{\dagger}}^{2k}\phi^{k-1}}{(1+f{\phi^{\dagger}}^{k}\phi^k{\phi^{\dagger}}^{k})}\right\}\Bigg]\hat{F}_{uni.}\end{aligned} \tag{351}$$

Now by using equation (150) and (151) for quantities in inflation and deflation in equation (351) and equation (350), we get-

$$\begin{aligned}\vec{F}_d = (\psi_p + \alpha'|\Delta\phi|).\frac{\partial \phi'}{\partial \tau}\hat{F}_{act.} - (\psi_p \\ + \alpha_u|\Delta\phi|)(\Phi_M^{\circ})_d \sum_{n=-\infty}^{\infty}\Bigg[a\frac{\partial\phi}{\partial\tau}\sum_{k=1}^{n-1}\frac{k\phi^{k-1}}{(1-a\phi^k)} \\ + b\frac{\partial\phi^{\dagger}}{\partial\tau}\sum_{k=1}^{n-1}\frac{k{\phi^{\dagger}}^{k-1}}{(1-a{\phi^{\dagger}}^{k})} \\ + 3c\frac{\partial\phi}{\partial\tau}\sum_{k=1}^{n-1}\frac{k\phi^{3k-1}}{(1-a\phi^{3k})} + 3d\sum_{k=1}^{n-1}\frac{k{\phi^{\dagger}}^{3k-1}}{(1-d{\phi^{\dagger}}^{3k})} + e\left\{2\frac{\partial\phi}{\partial\tau}\sum_{k=1}^{n-1}\frac{k{\phi^{\dagger}}^{k}\phi^{2k-1}}{(1-e\phi^k{\phi^{\dagger}}^{k}\phi^k)} + \frac{\partial\phi^{\dagger}}{\partial\tau}\sum_{k=1}^{n-1}\frac{k{\phi^{\dagger}}^{k-1}\phi^{2k}}{(1-e\phi^k{\phi^{\dagger}}^{k}\phi^k)}\right\} \\ + f\left\{2\frac{\partial\phi^{\dagger}}{\partial\tau}\sum_{k=1}^{n-1}\frac{k{\phi^{\dagger}}^{2k-1}\phi^k}{(1-f{\phi^{\dagger}}^{k}\phi^k{\phi^{\dagger}}^{k})} + \frac{\partial\phi}{\partial\tau}\sum_{k=1}^{n-1}\frac{k{\phi^{\dagger}}^{2k}\phi^{k-1}}{(1-f{\phi^{\dagger}}^{k}\phi^k{\phi^{\dagger}}^{k})}\right\}\Bigg]\hat{F}_{uni.}\end{aligned} \tag{352}$$

$$\vec{F}_i = (\psi_p - \alpha'|\Delta\phi|).\frac{\partial\phi'}{\partial\tau}\hat{F}_{act.} + (\psi_p - \alpha_u|\Delta\phi|)(\Phi_M^{\circ})_i \sum_{n=-\infty}^{\infty}\left[a\frac{\partial\phi}{\partial\tau}\sum_{k=1}^{n-1}\frac{k\phi^{k-1}}{(1+a\phi^k)} + b\frac{\partial\phi^\dagger}{\partial\tau}\sum_{k=1}^{n-1}\frac{k{\phi^\dagger}^{k-1}}{\left(1+a{\phi^\dagger}^k\right)} + 3c\frac{\partial\phi}{\partial\tau}\sum_{k=1}^{n-1}\frac{k\phi^{3k-1}}{(1+a\phi^{3k})} + 3d\sum_{k=1}^{n-1}\frac{k{\phi^\dagger}^{3k-1}}{\left(1+d{\phi^\dagger}^{3k}\right)} + e\left\{2\frac{\partial\phi}{\partial\tau}\sum_{k=1}^{n-1}\frac{k{\phi^\dagger}^k\phi^{2k-1}}{\left(1+e\phi^k{\phi^\dagger}^k\phi^k\right)} + \frac{\partial\phi^\dagger}{\partial\tau}\sum_{k=1}^{n-1}\frac{k{\phi^\dagger}^{k-1}\phi^{2k}}{\left(1+e\phi^k{\phi^\dagger}^k\phi^k\right)}\right\} + f\left\{2\frac{\partial\phi^\dagger}{\partial\tau}\sum_{k=1}^{n-1}\frac{k{\phi^\dagger}^{2k-1}\phi^k}{\left(1+f{\phi^\dagger}^k\phi^k{\phi^\dagger}^k\right)} + \frac{\partial\phi}{\partial\tau}\sum_{k=1}^{n-1}\frac{k{\phi^\dagger}^{2k}\phi^{k-1}}{\left(1+f{\phi^\dagger}^k\phi^k{\phi^\dagger}^k\right)}\right\}\right]\hat{F}_{uni.}$$

(353)

If motion increases by inflations in universal dynamics, then it also reduced during inflations by negative ϕ-ψ transformation and after certain epoch Universe starts slowing down. So, in this way inflations and deflations occurs in universe. We can also understand this phenomenon by a geometrical representation of N-time inflationary model of universe as-

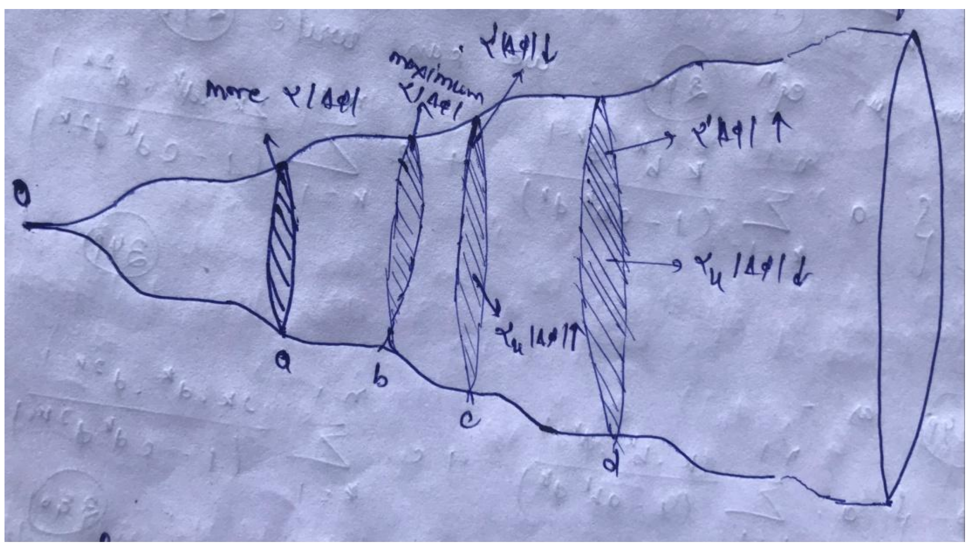


Fig. 17 –Representation of ϕ-ψ Transformation Increase and Decrease in Motion of Universe

Here a = starting open inflations with less $\alpha|\Delta\phi|$
b = ending of deflation with more $\alpha|\Delta\phi|$
c = epoch between the inflation with decreasing $\alpha|\Delta\phi|$
d = epoch between deflations with increasing $\alpha|\Delta\phi|$
It is clear from above equation (353) and equation (352) that at epoch a motion rapidly increases and universe convert into new phase and starts inflation with $\vec{F}_i$ and universe support the motion of bodies, at epoch be motion is minimum of universe vector and indicate existence of minor singularities in universe, at epoch bodies starts reducing their motion and at epoch d universe intend to perfection in new formed bodies and motion is $\vec{F}_d$.
Now I am taking evolution of quasi-symmetric scalar fields defined by me in my former paper [5] as-

$$\Phi = (a;b\phi)_n(c;d\phi^2)_n$$

(354)

{Here $a, b, c, d \in \mathbb{C}\ or\ \mathbb{R}$}

Now by differentiating equation (354) with respect to universal time (τ)-

$$\frac{\partial\Phi}{\partial\tau} = (c;d\phi^2)_n\frac{\partial}{\partial\tau}(a;b\phi)_n + (a;b\phi)_n\frac{\partial}{\partial\tau}(c;d\phi^2)_n$$

(355)

∵form equation (311)-

$$\frac{\partial}{\partial\tau}(a;b\phi)_n = -a(a;b\phi)_n\frac{\partial\phi}{\partial\tau}\sum_{k=1}^{n-1}\frac{kb^k\phi^{k-1}}{(1-ab^k\phi^k)}$$

(356)

Or similarly for second derivative-

$$\frac{\partial}{\partial\tau}(c;d\phi^2)_n = -c(c;d\phi^2)_n\frac{\partial\phi}{\partial\tau}\sum_{k=1}^{n-1}\frac{2kd^k\phi^{2k-1}}{(1-cd^k\phi^{2k})} \tag{357}$$

Now by putting both equations (356) and (357) in equation (355), we get-

$$\frac{\partial\Phi}{\partial\tau} = -(a;b\phi)_n(c;d\phi^2)_n\frac{\partial\phi}{\partial\tau}\left\{a\sum_{k=1}^{n-1}\frac{kb^k\phi^{k-1}}{(1-ab^k\phi^k)} + c\sum_{k=1}^{n-1}\frac{2kd^k\phi^{2k-1}}{(1-cd^k\phi^{2k})}\right\} \tag{358}$$

Now by using the relation in equation (354), we can write equation (358) as-

$$\frac{\partial\Phi}{\partial\tau} = -\Phi\frac{\partial\phi}{\partial\tau}\left\{a\sum_{k=1}^{n-1}\frac{kb^k\phi^{k-1}}{(1-ab^k\phi^k)} + c\sum_{k=1}^{n-1}\frac{2kd^k\phi^{2k-1}}{(1-cd^k\phi^{2k})}\right\} \tag{359}$$

We can also write above equation as-

$$\frac{1}{\Phi}\frac{\partial\Phi}{\partial\tau} = -\frac{\partial\phi}{\partial\tau}\left\{a\sum_{k=1}^{n-1}\frac{kb^k\phi^{k-1}}{(1-ab^k\phi^k)} + c\sum_{k=1}^{n-1}\frac{2kd^k\phi^{2k-1}}{(1-cd^k\phi^{2k})}\right\} \tag{360}$$

Now if we take scalar field in equation (354) as +ve quasi-symmetric scalar field, then-

$$\Phi = (-a;b\phi)_n(-c;d\phi^2)_n \tag{361}$$

So, we can also differentiate equation (361) with respect to τ and get-

$$\frac{1}{\Phi}\frac{\partial\Phi}{\partial\tau} = \frac{\partial\phi}{\partial\tau}\left\{a\sum_{k=1}^{n-1}\frac{kb^k\phi^{k-1}}{(1+ab^k\phi^k)} + c\sum_{k=1}^{n-1}\frac{2kd^k\phi^{2k-1}}{(1+cd^k\phi^{2k})}\right\} \tag{362}$$

We can also define some more quasi-symmetric scalar fields after something remarkable done in terms of transformation force.

3.2. Central System Force and Transformation Force

Now I intend to explain something which can be seen by naked eye. We can clearly see from equation (50) (for any conserved any energy system) and force by variation into scalar field in equation (78), we get-

$$\delta_{\rho_\phi} = k\alpha\psi_{per}\left(\Delta\rho_\phi\right)_{center} \;\; and \;\; d\psi\rho_\phi = -\psi d\rho_\phi$$

By making δ_{ρ_ϕ} for small variations-

$$\delta_{\rho_\phi} = k\alpha\psi_{per}\left(d\rho_\phi\right)_{center} \tag{363}$$

And by making equation (50) for imperfect body, we get-

$$\left(d\rho_\phi\right)_{center} = -\frac{d\psi_{center}}{\psi_{center}}\left(\rho_\phi\right)_{center} \tag{364}$$

As we know from diagram (5)-

$$\vec{\delta}_{\rho_\phi} = -\vec{\delta}_{\phi-\psi} \tag{365}$$

Now by combining equation (363) and (364), we get-

$$\delta_{\rho_\phi} = -k\alpha\psi_{per}\frac{d\psi_{center}}{\psi_{center}}\left(\rho_\phi\right)_{center} \tag{366}$$

Now by putting value of δ_{ρ_ϕ} in equation (366)-

$$\delta_{\phi-\psi} = -k\alpha\psi_{per}\frac{d\psi_{center}}{\psi_{center}}\left(\rho_\phi\right)_{center} \tag{367}$$

So, transformation force in any conserved energy system can be written as equation (367). This will only applicable when spin of that particular body is balanced by the Co body of itself or by another perfect body. Now I intend to describe about the Action defined by me in my former paper [5], as-

$$\boldsymbol{\mathcal{A}} = \int_{\tau_1}^{\tau_2}(E_aE_b)^{1/2}.\,d\tau + \int_{x_1}^{x_2}(E_aE_b)^{1/2}.\,d^nx \tag{368}$$

Now by equation (4), we can say about first integral in equation (368) as-

$$\boldsymbol{\mathcal{A}} = \int_{\tau_1}^{\tau_2}(E_aE_b)^{1/2}.\,\zeta\big(\mathrm{F}(\Phi_u)\big).\,d\tau + \int_{x_1}^{x_2}(E_aE_b)^{1/2}.\,d^nx \tag{369}$$

Now what should be the Langrangian and of energy terms-

$$E = \psi\phi = \psi_p\phi \pm \alpha\phi|\Delta\phi| \tag{370}$$

$$E = \psi_p\phi + \alpha\phi\Delta\phi \tag{371}$$

3.3. Langrangian, Hamiltonian and Proof of Positive Energy Theorem in Radiation and Matter Dominated Universe

Here as we know $\alpha\Delta\phi$ part supports the motion and increases with the propagation velocity. So, the second part must include kinetic energy term-

$$E_c = \alpha\phi\Delta\phi \equiv T \tag{372}$$

Or

$$E_p = \psi_p\phi \equiv V \tag{373}$$

Here T refers kinetic energy and V refers potential energy.
For broken part $(\psi_p)_b = 0$, so-

$$(E_p)_b = 0 \tag{374}$$

During inflations-

$$E_i = E_c + E_p = \psi_p\phi - \alpha\phi|\Delta\phi| \tag{375}$$

So

$$E_c = -\alpha\phi|\Delta\phi| \tag{376}$$

Or during deflations-

$$E_d = E_c + E_p = \psi_p\phi + \alpha\phi|\Delta\phi| \tag{377}$$

$$E_c = \alpha\phi|\Delta\phi| \tag{378}$$

Converged energy= $E_c = \alpha\phi|\Delta\phi| \equiv T$ or Perfection Energy = $E_p = \psi_p\phi \equiv V$
So, in inflations-

$$E_i \equiv -(T - V) = -\mathcal{L} \tag{379}$$

$$E_d \equiv (T + V) = \mathcal{H} \tag{380}$$

Here $\mathcal{L}$ is Langrangian and $\mathcal{H}$ is Hamiltonian of System.
From my last paper [5], we know that-

$$E \cong \psi_p\phi + \sum_{n\in\mathbb{R}}(E_b)_n \tag{381}$$

Now by comparing equation (381) with equation (377) and (375), we get for inflations-

$$\sum_{n\in\mathbb{R}}(E_b)_n = -\alpha\phi|\Delta\phi| \tag{382}$$

For deflations-

$$\sum_{n\in\mathbb{R}}(E_b)_n = \alpha\phi|\Delta\phi| \tag{383}$$

By summing overall and n^{th} bodies exist in universe, we get during inflations-

$$\sum_{n_i\in\mathbb{R}}\sum_{i=1}^{n_i}(E_b)_i = -\sum_{n_i\in\mathbb{R}}\alpha\phi|\Delta\phi| \tag{384}$$

Or energy of broken parts is negative or in other words we can say broken parts are observed by bodies or matter dominated epoch. So, during deflations-

$$\sum_{n_i\in\mathbb{R}}\sum_{i=1}^{n_i}(E_b)_i = \sum_{n_i\in\mathbb{R}}\alpha\phi|\Delta\phi| \tag{385}$$

So, energy by broken parts is positive or in other words we can define broken parts are released by bodies or radiation dominated epoch. So, during inflations universe becomes matter dominated and during deflation universe becomes radiation dominated. This above phenomenology can be represented in N-time inflationary model of universe as-

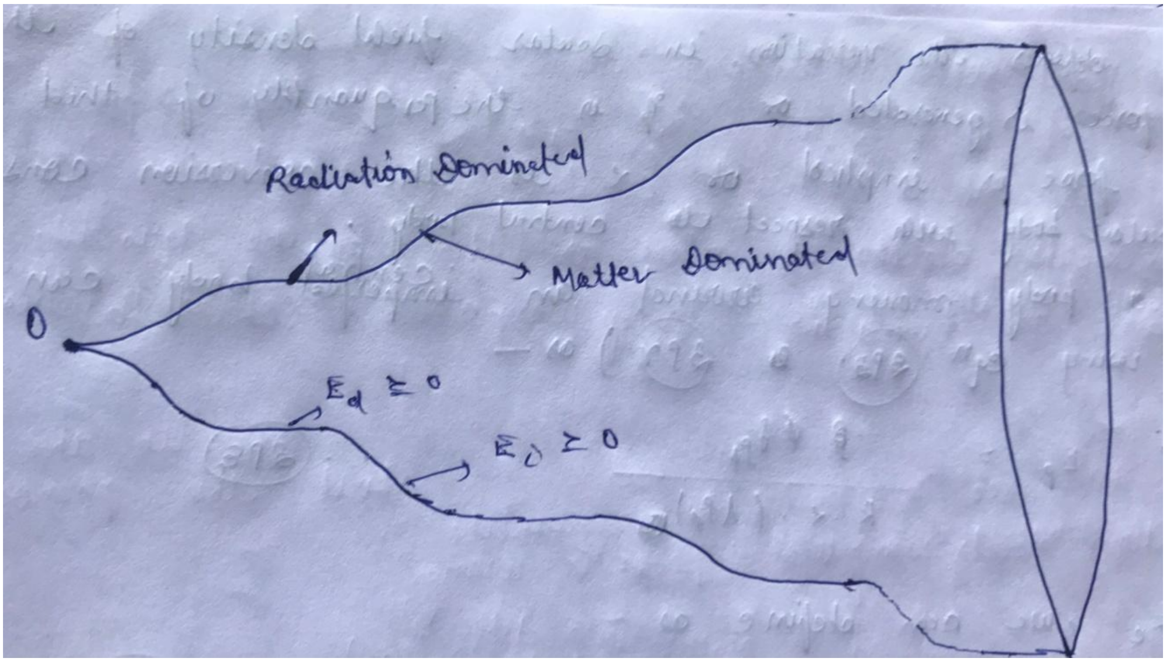


Fig. 18 –Radiation Dominated and Matter Dominated epochs in Universe

As I described in my formal paper [5] the relation between perfection quantity and converged quantity as-

$$\psi_p \geq \alpha|\Delta\phi| \quad (386)$$

Now by multiplying both sides of equation (386) with ϕ, we get-

$$\psi_p\phi \geq \alpha\phi|\Delta\phi| \quad (387)$$

So, for inflations-

$$E_i = \psi_p\phi - \alpha\phi|\Delta\phi| \geq 0 \quad (388)$$

Or for deflations-

$$E_d = \psi_p\phi + \alpha\phi|\Delta\phi| \geq 0 \quad (389)$$

So, in universal situation energy can be written as-

$$E_u = \sum_{n\in\mathbb{R}}(E_i)_n = \sum_{n\in\mathbb{R}}(E_d)_n \geq 0 \quad (390)$$

So, total energy of universe will be positive or $E_u \geq 0$. This is the other example of positive energy theorem formerly proven by Edward Witten [13]. From relation (387), we get-

$$\boxed{\boldsymbol{E_p \geq E_c}} \quad (391)$$

Now I intend to define potential energy (V) for different terms, like first I am using force by variation in scalar field density around an imperfect body or we can tell this as "central system force". Now by equation (80), we get-

$$\delta_{\rho_\phi} = k\alpha\psi_{per}\left(d\rho_\phi\right)_{center} \quad (392)$$

$$\because E_p = \psi_p\phi \quad (393)$$

From above equation (392) value of ψ_p is-

$$\boldsymbol{\psi_{per} = \frac{\delta_{\rho_\phi}}{k\alpha\left(d\rho_\phi\right)_{center}}}$$

(394)

We can also write it as-

$$\boxed{\boldsymbol{\delta_{\rho_\phi} = k\alpha\psi_{per}\left(\Delta\rho_\phi\right)_c}}$$

(395)

Here $\left(\Delta\rho_\phi\right)_c$ defines the variation in scalar field density of the body by which this force is generated or ψ_{per} is the perfection quantity of that body on which this force is employed or α is the conversion constant of that particular body with respect to central body. So, E_p of a body moving around a central body can be written by using equations (393) and (394) as-

$$E_p = \frac{\phi\delta_{\rho_\phi}}{k\alpha\left(d\rho_\phi\right)_c}$$

(396)

Now for E_c, we can define as-

$$\delta_{\rho_\phi} = k\alpha(\psi - \alpha\Delta\phi)_{per}\left(\Delta\rho_\phi\right)_c$$

(397)

Now by multiplying equation by ϕ, we get-

$$\phi\delta_{\rho_\phi} = k\alpha(\psi\phi - \alpha\phi\Delta\phi)_{per}\left(\Delta\rho_\phi\right)_c$$

(398)

$$E_c = \alpha\phi\Delta\phi = \pm\alpha\phi|\Delta\phi|$$

(399)

$$\boldsymbol{(\psi\phi - \alpha\phi\Delta\phi)_{per} = \frac{\phi\delta_{\rho_\phi}}{k\alpha\left(d\rho_\phi\right)_c}}$$

(400)

Or

$$E - E_c = \frac{\phi\delta_{\rho_\phi}}{k\alpha\left(d\rho_\phi\right)_c}$$

(401)

From here E_c is-

$$E_c = E - \frac{\phi\delta_{\rho_\phi}}{k\alpha\left(d\rho_\phi\right)_c}$$

(402)

$$\because \delta = -\frac{dV}{dx}$$

(403)

For earth and sun, we can write-

$$\delta_{\rho_\phi} = k_{solar-system}\,\alpha_{SE}\psi_E\left(\Delta\rho_\phi\right)_S \cong \frac{GM_EM_S}{r^2}$$

(404)

So, we can find variation in scalar field density of sun at earth as-

$$\left(\Delta\rho_\phi\right)_S \cong \frac{GM_EM_S}{k_{solar-system}\,\alpha_{SE}\psi_E r^2}$$

(405)

From general relativity [7] we can also define field equation for earth-sun system as-

$$R_{\mu\nu} - \frac{1}{2}g_{\mu\nu}R + \Lambda R_{\mu\nu} = \frac{8\pi G}{c^4}T_{\mu\nu}$$

(406)

But if G and c both are not universal constants as proven by me, then what will happen to these field equations? In similar way Maxwell's field equations [16] also need to be modified. So, one query must be hitting your mental lexicon that what is the expression of force generated by quantity of imbalance cube or what will be the alternative to Coulomb [14] and Lorentz force [15] in my theoretical perspective.

3.4. Evolution Factor of Scalar Fields

By not answering this particular question here now I intend to define a new parameter as (evolution factor of scalar field (Γ))-

$$\Gamma = \frac{1}{\Phi}\frac{\partial\Phi}{\partial\tau}$$

(407)

From our former analysis we can see that Γ is negative for negative scalar fields and Γ is positive for positive scalar fields. Let us define gamma for scalar fields defined by me in my former Article [5] as partially symmetric-

$$\begin{cases} \Phi = (c;\phi^2)_n.(e^2;\phi^2)_n & (408) \\ \Phi = (\phi;d\phi)_n.(\phi^2;f\phi)_n & (409) \\ \Phi = (c;\phi^2)_n.(\phi^2;\phi^2)_n & (410) \end{cases}$$

Now by differentiating equation (407) with respect to time, we get-

$$\frac{\partial \Phi}{\partial \tau} = \frac{\partial}{\partial \tau}(c;\phi^2)_n.(e^2;\phi^2)_n + (c;\phi^2)_n.\frac{\partial}{\partial \tau}(e^2;\phi^2)_n \tag{411}$$

$$\frac{\partial}{\partial \tau}(c;\phi^2)_n = -c(c;\phi^2)_n\frac{\partial \phi}{\partial \tau}\sum_{k=1}^{n-1}\frac{2k\phi^{2k-1}}{(1-c\phi^{2k})} \tag{412}$$

$$\frac{\partial}{\partial \tau}(e^2;\phi^2)_n = -e^2(e^2;\phi^2)_n\frac{\partial \phi}{\partial \tau}\sum_{k=1}^{n-1}\frac{2k\phi^{2k-1}}{(1-e^2\phi^{2k})} \tag{413}$$

Now by putting the values of derivatives from equation (412) and (413) in equation (411), we get-

$$\frac{\partial \Phi}{\partial \tau} = -\Phi\frac{\partial \phi}{\partial \tau}\left\{c\sum_{k=1}^{n-1}\frac{2k\phi^{2k-1}}{(1-c\phi^{2k})} + e^2\sum_{k=1}^{n-1}\frac{2k\phi^{2k-1}}{(1-e^2\phi^{2k})}\right\} \tag{414}$$

Now by putting equation (407) in above equation, we get-

$$\Gamma(\Phi) = -\frac{\partial \phi}{\partial \tau}\left\{c\sum_{k=1}^{n-1}\frac{2k\phi^{2k-1}}{(1-c\phi^{2k})} + e^2\sum_{k=1}^{n-1}\frac{2k\phi^{2k-1}}{(1-e^2\phi^{2k})}\right\} \tag{415}$$

So, Γ is negative for this particular kind of scalar field. This will form a stable central system into itself. Now if we define the evolution factor for a scalar field (Γ) as-

$$\Gamma(\Phi) = Я^{\circ}\frac{\partial \phi}{\partial \tau} \tag{416}$$

For equation (415) the value of $Я^{\circ}$ is-

$$Я^{\circ} = -\left\{c\sum_{k=1}^{n-1}\frac{2k\phi^{2k-1}}{(1-c\phi^{2k})} + e^2\sum_{k=1}^{n-1}\frac{2k\phi^{2k-1}}{(1-e^2\phi^{2k})}\right\} \tag{417}$$

For $\phi^{\dagger}$ type of generator containing scalar fields, we can write equation (416) as-

$$\Gamma(\Phi) = Я^{\circ}\frac{\partial \phi}{\partial \tau} + Я^{\dagger}\frac{\partial \phi^{\dagger}}{\partial \tau} \tag{418}$$

So, evolution factor of a particular scalar field is related to the evolution of generators of itself.

3.5. Flow Function in Terms of Evolution Factor

Evolution factor (***Γ***) is an essential parameter to calculate the flow function of a particular scalar field $Ƒ(\boldsymbol{\Phi})$. As I promised in my starting of this article that I will also find how flow function can be defined mathematically for a particular kind of scalar field. So, we can define flow function as some linear or non-linear combination of evolution factors (***Γ***) of various kinds of scalar fields as-

$$Ƒ(\Phi) = \alpha_1\Gamma(\Phi_1) + \alpha_2\Gamma(\Phi_2) + \cdots + \alpha_n\Gamma(\Phi_n) \tag{419}$$

Here α_i is the conversion constant of scalar field Φ_i with respect to the conversion constant of universal scalar field. Usually the evolution factor of universe can be described as-

$$\Gamma(\Phi_u) = \frac{1}{\Phi_u}\frac{\partial \Phi_u}{\partial \tau} = \frac{1}{k\Phi_u} = \frac{k'}{\Phi_u}\left\{\because \frac{\partial \Phi_u}{\partial \tau} = \frac{1}{k} = \frac{\partial}{\partial \tau}\left(N\sum_{n\in\mathbb{R}}\eta\Phi_n^c\right)\right\} \tag{420}$$

Now we need some fluid mechanics to define flow functions equations of various kinds of scalar fields in universe. We can also write motion in terms of Γ as-

$$F = \psi.\phi_{covered} \tag{421}$$

$$\left\{\because \phi_{covered} = \frac{\partial s'}{\partial \tau} + \frac{\partial s_u}{\partial \tau}\right\}$$

$$\vec{F} = \psi.\frac{\partial s'}{\partial \tau}\hat{F}_{act.} + \psi.\frac{\partial s_u}{\partial \tau}\hat{F}_{uni.} \quad (422)$$

$$\Phi\Gamma(\Phi) = \frac{\partial \Phi}{\partial \tau} \quad (423)$$

Now by multiplying above equation with ∂s we get-

$$\Phi\Gamma(\Phi) = \frac{\partial \Phi}{\partial \tau}\frac{\partial s}{\partial s} = \frac{\partial \Phi}{\partial s}\frac{\partial s}{\partial \tau}$$

So, we can define motion in a body by putting equation (423) in equation (422), as-

$$\vec{F} = \psi.\Phi'\Gamma(\Phi')\frac{\partial s'}{\partial \Phi'}\hat{F}_{act.} + \psi.\Phi_u\Gamma(\Phi_u)\frac{\partial s_u}{\partial \Phi_u}\hat{F}_{uni.} \quad (424)$$

$$\{\because E = \psi\phi\}$$

So, we get motion as-

$$\vec{F} = E'\Gamma(\Phi')\frac{\partial s'}{\partial \Phi'}\hat{F}_{act.} + E_b^u\Gamma(\Phi_u)\frac{\partial s_u}{\partial \Phi_u}\hat{F}_{uni.} \quad (425)$$

Here E_b^u is the energy in body by flow of universal scalar field. Now one query must be hitting your mental lexicon, that if $E = \psi\phi$ then, what is the physical meaning of quantities like $\psi\phi^2$ or $\psi^2\phi$ etc?

Now as we know from my former paper [5], that-

$$\phi_{covered} = \vec{v}_p + k_\phi\vec{\digamma}(\phi) \quad (426)$$

Or

$$\phi_{covered} = \vec{v}_p + k_\phi\vec{\digamma}(\Phi') + k_{\phi'}\vec{\digamma}(\Phi_u) \quad (427)$$

Now I am defining a new fact that "if all fundamental interactions are due to scalar fields, then all type of former fields in physics (like electric field, magnetic field Einstein's gravitational fields, electroweak fields, quantum fields etc) can be defined in terms of scalar fields on various geometrical scales and their flows ($\digamma$)". So, there should exist two kind of interaction fields in universe- Flow dependent (like E, B etc) and Flow independent (like Gravitational Field). So, we can describe electric (E) and magnetic fields (B) by the flow functions of scalar fields ($\digamma(\phi)$) around a body like electron or proton. Usually these electric (E) and magnetic (B) fields are generated by the spin of bodies. I will prove this fact in a separate paper on unification of all fundamental forces. You can also see the generation of electromagnetic fields around a particular body in my first paper [1].

3.6. Time in Different Senses

Now I intend to define time. As I defined earlier "time is the flow of universal scalar field". Now if this is the particular definition exist of time then how our former definitions are satisfied by this like black hole is the starting of time but as I described formally that black hole is a minor singularity and it is not the starting of time but these minor singularities change the mood of time or in another sense we can say these minor singularities change the flow of time. Now a beautiful fact comes out from Heisenberg uncertainty relation [17] about time energy and position quantity of motion as-

$$\Delta x.\Delta F \geq \hbar/2 \quad (428)$$

$$\Delta \tau.\Delta E \geq \hbar/2 \quad (429)$$

From here we can conclude that time is very much related to scalar fields and positions are related to quantities of body. Or time dilation in special relativity [6]-

$$\tau = \frac{\tau_\circ}{\sqrt{1-\frac{v^2}{c^2}}} \quad (430)$$

In this way time is dependent to propagation speed of photons (broken parts in atoms). Now according to me if speed of light (c) is not a universal constant, then the time will not be a property of broken parts of atoms only. This mistake lead the Hawkins's definition of time is above described. Now if the above definition of time holds then, what should be the proper mathematical description of the time in terms of flow function ($\digamma(\phi)$) and what should be the nature of the flow function like scalar field, vector or tensor? As we know-

$$\Phi\Gamma(\Phi) = \frac{\partial \Phi}{\partial \tau} \quad (431)$$

$$\frac{1}{\Gamma(\Phi)} = \Phi\frac{\partial \tau}{\partial \Phi} = \Phi\frac{d\tau}{d\Phi} = \Phi\frac{\Delta \tau}{\Delta \Phi} \quad (432)$$

Or

$$d\tau = \frac{1}{\Phi\Gamma(\Phi)}.d\Phi$$
(433)

$$\Rightarrow \int \zeta(\mathrm{F}(\Phi_u)).d\tau = \int \frac{1}{\Phi\Gamma(\Phi)}.d\Phi + C$$
(434)

Usually the integration on left hand side $\int \zeta(\mathrm{F}(\Phi_u)).d\tau$ is the time. So, we can write equation (434) as-

$$\boxed{\tau = \int \frac{1}{\Phi\Gamma(\Phi)}.d\Phi + C}$$
(435)

So, we can define time as equation (435) and here C is integration constant. Now by solving further to integration on right hand side in-equation (435), we get-

$$\int \frac{1}{\Phi\Gamma(\Phi)}.d\Phi = \frac{1}{\Gamma(\Phi)}\ln\Phi + \int \frac{1}{\Gamma^2(\Phi)}\Gamma'(\Phi)\ln\Phi\,.d\Phi$$
(436)

$$\because \int f(x)g(x).dx = \int f(x)g(x).dx - \int g^{'}(x)\left(\int f(x)dx\right).dx$$

So, in this way by putting equation (436) in (435), we get-

$$\boxed{\tau = \frac{1}{\Gamma(\Phi)}\ln\Phi + \int \frac{1}{\Gamma^2(\Phi)}\Gamma'(\Phi)\ln\Phi\,.d\Phi + C}$$
(437)

For time of universe we can use $\Phi = \Phi_u$, then-

$$\tau_u = \frac{1}{\Gamma(\Phi_u)}\ln\Phi_u + \int \frac{1}{\Gamma^2(\Phi_u)}\Gamma'(\Phi_u)\ln\Phi_u\,.d\Phi_u + C$$
(438)

By this formula we can define the nature of universal scalar field at starting of time in universe ($\tau_u = 0$)-

$$\frac{1}{\Gamma(\Phi_u^{\circ})}\ln\Phi_u^{\circ} + \int \frac{1}{\Gamma^2(\Phi_u^{\circ})}\Gamma'(\Phi_u^{\circ})\ln\Phi_u^{\circ}\,.d\Phi_u^{\circ} + C^{\circ} = 0$$
(439)

Here

$$\Gamma^{'}(\Phi) = \frac{\partial}{\partial\Phi}\left\{\frac{1}{\Phi}\frac{\partial\Phi}{\partial\tau}\right\} = -\frac{1}{\Phi^2}\frac{\partial\Phi}{\partial\tau} + \frac{1}{\Phi}\frac{\partial}{\partial\Phi}\left(\frac{\partial\Phi}{\partial\tau}\right)$$
(440)

So, by finding the scalar field we can define time or by finding time of particular epoch we can define scalar field characteristics at that epoch. So, time of a particular physical entity is directly linked to scalar field of that physical entity.

3.7. Heisenberg's Uncertainty and Positive Energy Theorem

Now I am explaining a beautiful fact here about Heisenberg's uncertainty principle. We can write equation (432) for atomic central systems as-

$$\Delta\tau_{atomic} = \frac{1}{\Phi_{atomic}\,\Gamma(\Phi_{at.})}.d\Phi_{atomic}$$
(441)

Now by using relation for variation in energy-

$$\Delta E_{atomic} = \psi_{atomic}\,\Delta\Phi_{atomic} + \Phi_{atomic}\,\Delta\psi_{atomic}$$
(442)

Now by putting both relations into equation (429), we get-

$$\frac{1}{\Phi_{atomic}\,\Gamma(\Phi_{at.})}\{\psi_{atomic}\,\Delta\Phi_{atomic} - \Phi_{atomic}\,\Delta\psi_{atomic}\} \geq \frac{\hbar}{2}$$
(443)

If $\Delta\Phi$ is positive then, $\Delta\psi$ will be surely negative (by conservation of total quantity).
From here we can clearly see that the whole quantity will be greater than $\frac{\hbar}{2}$ if-

$$\psi_{atomic}\,\Delta\Phi_{atomic} \geq \Phi_{atomic}\,\Delta\psi_{atomic}$$
(444)

This relation proves my former expressions-

$$\psi_p \geq \alpha\Delta\phi$$
(445)

Or

$$\psi \geq \alpha\phi$$
(446)

Now by solving further to the expression (443), we get-

$$\frac{\psi_{atomic}}{\Phi_{atomic}}.\Delta\Phi_{atomic}^2 - \Delta\Phi_{atomic}\,\Delta\psi_{atomic} \geq \frac{\hbar.\Gamma(\Phi_{atomic})}{2} \quad (447)$$

For ϕ-ψ transformation in atoms we can write-

$$\alpha.\Delta\Phi_{atomic} = \Delta\psi_{atomic} \quad (448)$$

Now by putting above relation in equation (447), we get-

$$\frac{\psi_{atomic}}{\Phi_{atomic}}.\Delta\Phi_{atomic}^2 - \alpha.\Delta\Phi_{atomic}\,\Delta\Phi_{atomic} \geq \frac{\hbar.\Gamma(\Phi_{atomic})}{2} \quad (449)$$

Now by putting similar relations together in equation (449), we get-

$$\Delta\Phi_{atomic}^2\left\{\frac{\psi_{atomic}}{\Phi_{atomic}} - \alpha\right\} \geq \frac{\hbar.\Gamma(\Phi_{atomic})}{2} \quad (450)$$

From here we can conclude, that-

$$\frac{\psi_{atomic}}{\Phi_{atomic}} - \alpha > 0 \quad (451)$$

Now by putting $\psi_{atomic} = \alpha\Phi'_{atomic}$, we get-

$$\frac{\alpha\Phi'_{atomic}}{\Phi_{atomic}} - \alpha > 0 \quad (452)$$

$$\alpha\Phi'_{atomic} > \alpha\Phi_{atomic} \quad (453)$$

So, we can write relation (453) as-

$$\psi_{atomic} > \alpha\Phi_{atomic} \quad (454)$$

So, Heisenberg uncertainty proves my relation (446) or positive energy theorem also in equation (391).
Now by putting value of ħ from my former Article [5] in equation (443)-

$$n\hbar = \mathcal{s}\frac{\psi_p}{\alpha\Delta\phi} \quad (455)$$

$$\Delta\Phi_{atomic}^2\left\{\frac{\alpha\Phi'_{atomic}}{\Phi_{atomic}} - \alpha\right\} \geq \frac{\mathcal{s}}{n}\frac{(\psi_p)_{atomic}}{\alpha\Delta\Phi_{atomic}}\frac{\Gamma(\Phi_{atomic})}{2} \quad (456)$$

So, by simplifying the above equation, we get-

$$\alpha^2\Delta\Phi_{atomic}^3\left\{\frac{\Phi'_{atomic}}{\Phi_{atomic}} - 1\right\} \geq \frac{\mathcal{s}.(\psi_p)_{atomic}.\Gamma(\Phi_{atomic})}{2n} \quad (457)$$

$$\because (\psi_p)_{atomic} = \psi_{atomic} - \alpha\Delta\Phi_{atomic} \quad (458)$$

Now by putting equation (458) in equation (457), we get-

$$\alpha^2\Delta\Phi_{atomic}^3\{\Phi'_{atomic} - \Phi_{atomic}\} \geq \frac{\mathcal{s}.\Phi_{atomic}\{\psi_{atomic} - \alpha\Delta\Phi_{atomic}\}.\Gamma(\Phi_{atomic})}{2n} \quad (459)$$

Now by some manipulations in above expression, we get-

$$\psi_{atomic} - \alpha\Phi_{atomic} \geq \frac{\mathcal{s}.\Phi_{atomic}.\Gamma(\Phi_{atomic})}{2n.\alpha.\Delta\Phi_{atomic}^3}\{\psi_{atomic} - \alpha\Delta\Phi_{atomic}\} \quad (460)$$

Now by removing similar terms in above equation, we get-

$$\frac{\mathcal{s}.\Phi_{atomic}.\Gamma(\Phi_{atomic})}{2n.\gamma.\alpha.\Delta\Phi_{atomic}^3} \leq 1 \quad (461)$$

$$here\ \gamma = \frac{\psi_{atomic} - \alpha\Phi_{atomic}}{\{\psi_{atomic} - \alpha\Delta\Phi_{atomic}\}}$$

We can also write above inequality as-

$$\frac{\mathcal{s}.\Phi_{atomic}.\Gamma(\Phi_{atomic})}{2n.\gamma.\alpha} \leq \Delta\Phi_{atomic}^3 \quad (462)$$

Now by multiplying by $\alpha^3\Phi_{atomic}^3$ both sides in equation (462), we get-

$$\frac{\mathcal{s}.\alpha^2\Phi_{atomic}^4\,.\Gamma(\Phi_{atomic}\,)}{2n\gamma} \leq \alpha^3\Phi_{atomic}^3\,\Delta\Phi_{atomic}^3$$
(463)

As we know that $(E_c)_{atomic} = \alpha\Phi_{atomic}\,\Delta\Phi_{atomic}$ or converged energy of atoms. So, Converged the energy of a particular atomic body will follow this relation-

$$(E_c^3)_{atomic} \geq \frac{\mathcal{s}.\alpha^2}{2n\gamma}\Phi_{atomic}^4\,.\Gamma(\Phi_{atomic}\,)$$
(464)

An electron like body will also follow the relation by putting n as spin coefficient of angular momentum of electron in terms of spin quanta. So, for an electron the relation (464) will be-

$$(E_c^3)_e \geq \frac{\mathcal{s}.\alpha^2}{2n\gamma}\Phi_e^4.\Gamma(\Phi_e)$$
(465)

Here γ follows the relation-

$$\gamma = \frac{\psi_e - \alpha\Phi_e}{\psi_e - \alpha\Delta\Phi_e}$$
(466)

As I formerly intend to describe the evolution factor is also related to derivative of scalar fields of generators (ϕ).

3.8. Evolution Factor and Flow Function Tensors

Now let's differentiate equation (265) with respect to ϕ, we get-

$$\frac{\partial\Phi}{\partial\phi} = -a(a;\phi)_n\sum_{k=1}^{n-1}\frac{k\phi^{k-1}}{(1-a\phi^k)}$$
(467)

So, we can write it as-

$$\frac{1}{\Phi}\frac{\partial\Phi}{\partial\phi} = -a\sum_{k=1}^{n-1}\frac{k\phi^{k-1}}{(1-a\phi^k)}$$
(468)

Now by putting right hand side as-

$$Я = -a\sum_{k=1}^{n-1}\frac{k\phi^{k-1}}{(1-a\phi^k)}$$
(469)

Now by multiplying both sides of equation (469) with $\frac{\partial\phi}{\partial\tau}$, we get-

$$Я\frac{\partial\phi}{\partial\tau} = -a\frac{\partial\phi}{\partial\tau}\sum_{k=1}^{n-1}\frac{k\phi^{k-1}}{(1-a\phi^k)}$$
(470)

The right hand side becomes $\Gamma(\Phi)$ evolution factor of scalar field, as-

$$\boxed{\Gamma(\Phi) = Я\frac{\partial\phi}{\partial\tau}}$$
(471)

This relation holds only for ϕ-Series with generators ϕ not for $\phi^\dagger$. So, the scalar field includes generator of derivative must be taken with respect to $\phi^\dagger$ to get our hopes ϕ-Series. Evolution factor $\Gamma(\Phi)$ is a tensor quantity. I will also prove this by some representation but at first I am explaining the value of evolution factor in terms of Я. So, for a scalar field like equation (313) the evolution factor can be written as-

$$\Gamma(\Phi) = Я\frac{\partial\phi}{\partial\tau} + Я^\dagger\frac{\partial\phi^\dagger}{\partial\tau}$$
(472)

Now for mixed scalar fields like having mixed ϕ-Series like $(c;\phi\phi^\dagger\phi)_n$ also have same equation (472) for calculating evolution factor. Now as I promised before this simplification here I am representing another geometrical representation of a scalar field as-

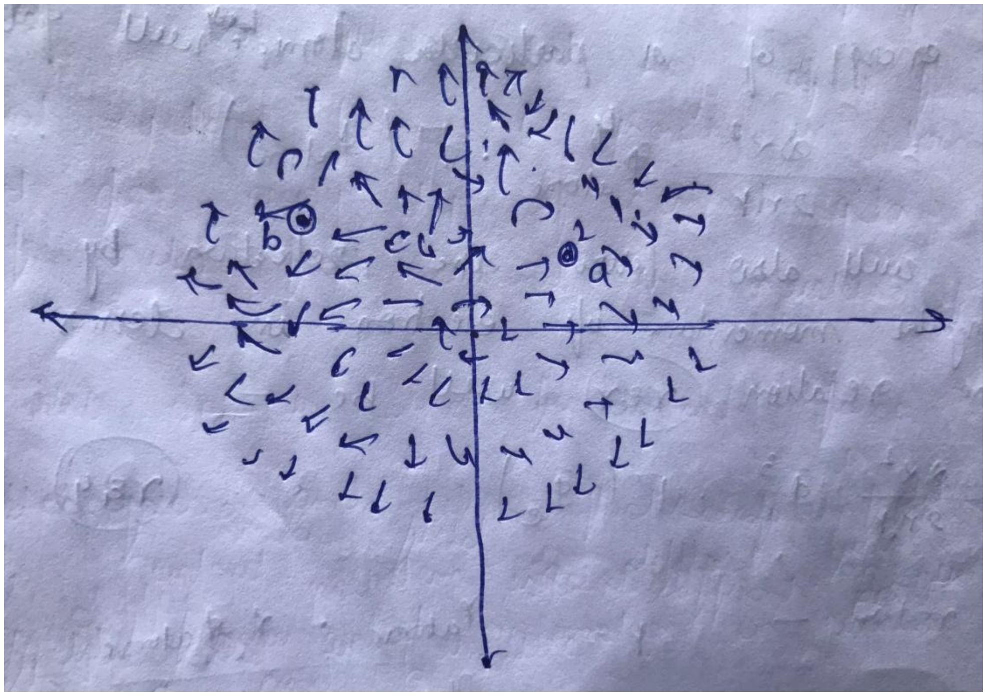


Fig. 19 –Flow of Scalar Fields

Here points a and b are two different points in scalar field. Here evolution of scalar field is different on both points but including same generators. So, evolution factor of scalar field is different on different points in scalar field and these kinds of quantities are justified as tensor. Now if the evolution factor is a tensor then flow function of a scalar field will also be a tensor quantity. At a particular point of observation we can define flow function as vector $\vec{\mathrm{F}}_a(\Phi)$ but for whole scalar field its flow function will also be a tensor with some combination of evolution factors. Now one more question have been taken place in your forehead that what should be the rank of evolution factor or according to evolution factor what must be the rank of flow function $\mathrm{F}(\Phi)$? Is the rank of this tensor depending upon the order of scalar field? Now I am explaining the flow function of mixed scalar fields more than two as and n-rank tensor in terms of evolution factor of them as-

$$\mathrm{F}_{\mu\nu\alpha\beta\ldots n}(\Phi) = \Gamma_{\mu\nu\ldots k_1}(\Phi_1) * \Gamma_{\mu\nu\ldots k_2}(\Phi_2) * \ldots * \Gamma_{\mu\nu\ldots k_r}(\Phi_r) \tag{473}$$

Here $k_1, k_2, \ldots, k_r \leq n$ or n is the rank of flow function. Here $*$ is some algebra between tensors of different ranks evolution factor of all mixed scalar fields. Each evolution factor includes the differentiation done by me in my former paper [5] $\frac{(\partial\phi_1 + i\partial\phi_2)}{(\partial\tau_1 + i\partial\tau_2)} = \frac{\partial\phi}{\partial\tau}$. Now as I promised in my starting of this paper the mathematical and physical queries about the nature of scalar fields of various kinds and their flow functions or the time according to these evolutions has been defined. So, I am giving a final touch to this article by concluding some facts from it.

4. Conclusions

- Every time integral in universal frame of reference must be calculated by using a function $\zeta(\mathrm{F}(\Phi_u))$ which is a unitary function.
- There exist two kinds of energies in universe. First one is transformable and second one is Non-transformable or static energy.
- Transformations in universe cause the motion in universe.
- Scalar field density variation caused by ϕ-ψ transformation around a body or it is a fundamental key to formation of scalar fields in universe.
- Basic central system force (gravity in terms of solar system) can be defined for every type of central systems as δ_{ρ_ϕ} by variation in density of scalar field around the nucleus of central system.
- For atoms also δ_{ρ_ϕ} is the fundamental force not the electromagnetic force.
- Quantum mechanics and general relativity can be unified by the principle of "central system relativity".
- Each and every fundamental interaction in universe is a manifestation of scalar fields exist in universe.
- A particular body includes Φ_L° and Φ_S° as their surrounding scalar fields and these are separated by a critical boundary around that body.
- For perfect bodies the generators are less interacting but for imperfect bodies scalar field generators are more interacting.
- Interacting strength of generators open scalar fields are anti proportionally related to perfection constant of a body or represented by I°.
- During inflations and deflations the whole quantities of the body are different.
- There exist some relations between radius of quantity in body r, critical radius r_c and interaction radius r_i.
- The quantity in a body (ψ) is always greater or equal to the quantity formed by outer scalar field (ψ').
- During inflations universe is matter dominated or during deflation universe becomes radiation dominated.
- Total energy of universe is always positive or zero.
- Heisenberg uncertainty relations also prove the positive energy theorem.
- Time of a particular body depends upon the evolution factor $\Gamma(\Phi)$.

- Flow function is some manifestation of evolution factor or both are tensor.
- Flow function is n-rank tensor.

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