《Universal and Unified Field Theory》

1. Topological Framework, World Equations and Universal Fields

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Abstract: The workings of ***Universal Topology*** unfolds a duality of our natural world at the following remarks:

a. Dual complex manifolds and the interactive world planes beyond a single non-complex spacetime manifold,

b. Two pairs of the scalar potentials for field entanglements complementarily, reciprocally and interdependently,

c. A mathematical framework of the dual variances to clone the event operations as an inevitable feature of reality,

d. ***Law of Event Evolutions*** carry out ***World Equations***, *Motion Operations*, *Geodesic* routing and *Horizon* hierarchy,

e. A set of the holistic ***Universal Field Equations***, foundational and general to all dynamic fields of natural evolutions.

Upon this foundation, our *Universal Topology and Framework* are ready to give rise to the unified classical and contemporary physics ...

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INTRODUCTION

In our universe, a duality of the two-sidedness lies at the heart of all events as they are interrelate, opposite or contrary to one another, each dissolving into the other in alternating streams that operates a life of creation, generation, or actions complementarily, reciprocally and interdependently. The nature consistently emerges as or entangle with a set of the fields that communicates and projects their interoperable values to its surrounding environment, alternatively arisen by or acting on its opponent through the reciprocal interactions. Therefore, it provides the context for our main philosophical interpretation to extend our fundamental physics into a duality of a oneness of natural world.

I. DUAL COMPLEX MANIFOLDS

As the nature duality, our world always manifests a mirrored pair in the imaginary part or a conjugate pair of the complex manifolds, such that the physical nature of P functions is associated with its virtual nature of V functions to constitute a duality of the real world functions. Among them, the most fundamental dynamics are our dark resources of the universal energies, known as *Yin* "–" and *Yang* "+" dark objects, with neutral balance "0" that appears as if there were nothing. Each type of the dark objects $(-,+,0)$ appearing as energy fields has their own domain of the relational manifolds such that one defines a Y^- (Yin) manifold while the other the Y^+ (Yang) manifold, respectively. They jointly present the two-sidedness of any events, operations, transportations, and entanglements, each dissolving into the other in the alternating streams that generates the life of entanglements, conceals the inanimacy of resources, and operates the event actions.

As a two-dimensional plane, the virtual positions of $\pm i\mathbf{k}$ naturally form a duality of the conjugate manifolds: $Y^-\{\mathbf{r}+i\mathbf{k}\}$ and $Y^+\{\mathbf{r}-i\mathbf{k}\}$. Each of the system constitutes its world plane $W^\pm$ distinctively, forms a duality of the universal topology $W = P \pm iV$ cohesively, and maintains its own sub-coordinate system $\{\mathbf{r}\}$ or $\{\mathbf{k}\}$ respectively. Because of the two dimensions of the world planes $\{\mathbf{r}\pm i\mathbf{k}\}$, each transcends its event operations further down to its sub-coordinate system with extra degrees of freedoms for either physical dimensions $\mathbf{r}=\{x_1,x_2,x_3\}$ or virtual dimensions $\mathbf{k}=\{x_0,x_{-1},x_{-2},\cdots\}$. For example, in the scope of space and time duality, the compound dimensions become the tetrad-coordinates, known as the following:

$$x_m \in \check{x}\{x_0,x_1,x_2,x_3\} \subset Y^-\{\mathbf{r}+i\mathbf{k}\} \quad : x_0 = ict \tag{1.1}$$

$$x^\mu \in \hat{x}\{x^0,x^1,x^2,x^3\} \subset Y^+\{\mathbf{r}-i\mathbf{k}\} \quad : x^0 = -ict \tag{1.2}$$

where $i\mathbf{k} = ict = x_0 = -x^0$. As a consequence, a manifold appears as or is combined into the higher dimensional coordinates, which results in the spacetime manifolds in the four-dimensional spaces.

Together, the two world planes $\{\mathbf{r}\pm i\mathbf{k}\}$ compose the dynamics of ***Boost***, an inertial for generators, and ***Spiral***, a rotational contortions for stresses, which function as a reciprocal or conjugate duality transporting and transforming global events among sub-coordinates. Consequently, for any type of the events, the Y^-Y^+ functions are always connected, coupled, and conjugated between each other, a duality of which defines entanglements as the virtually inseparable and physically reciprocal pairs of all natural functions.

II. POTENTIAL FIELDS

Governed by a global event λ under the universal topology, an operational environment is initiated by the scalar fields $\phi(\lambda)$ of a rank-0 tensor, a differentiable function of a complex variable in its domain at its zero derivative, where a scalar function $\phi(\hat{x}) \subset Y^+$ or $\phi(\check{x}) \subset Y^-$ is characterized as a single magnitude with variable components of the respective coordinate sets $\hat{x}$ or $\check{x}$. Because a field is incepted or operated under either virtual or physical primacy of an Y^+ or Y^- manifold respectively and simultaneously, each point of the fields is entangled with and appears as a conjugate function of the scalar field φ^- or φ^+ in its opponent manifold. A field can be classified as a scalar field, a vector field, or a tensor field according to whether the represented physical horizon is at a scope of scalar, vector, or tensor potentials, respectively.

Therefore, the effects are stationary projected to and communicated from their reciprocal opponent, shown as the following conjugate pairs:

$$\phi^+(\hat{x},\lambda), \varphi^-(\check{x},\lambda) \quad : \varphi^-(\check{x},\lambda) \mapsto \phi^+(\hat{x}^*,\lambda)^*, \ \hat{x}^* \in Y\{x_\mu\} \tag{2.1}$$

$$\phi^-(\check{x},\lambda), \varphi^+(\hat{x},\lambda) \quad : \varphi^+(\hat{x},\lambda) \mapsto \phi^-(\check{x}^*,\lambda)^*, \ \check{x}^* \in Y\{x^\nu\} \tag{2.2}$$

where * denotes a complex conjugate. A conjugate field $\varphi^- = (\phi^+)^*$ of the Y^+ scalar is mapped to a field in the Y^- manifold, and vise versa that a conjugate field $\varphi^+ = (\phi^-)^*$ of the Y^- scalar is mapped to a field in the Y^+ manifold. In mathematics, if $f(z)$ is a holomorphic function restricted to the *Real Numbers*, it has the complex conjugate properties of $f(z) = f^*(z^*)$, which leads to the above equation when $\hat{x}^* = \check{x}$ is satisfied.

III. MATHEMATICAL FRAMEWORK

As a part of the natural architecture, the mathematical regulation of terminology not only includes symbol notation, operators, and indices of vectors and tensors, but also classifies the mathematical tools and their interpretations under the universal topology. In order to describe the nature precisely, it is essential to define a duality of the contravariant $Y^+ = Y\{\mathbf{r}-i\mathbf{k}\}$ manifold and the covariant $Y^- = Y\{\mathbf{r}+i\mathbf{k}\}$ manifold, respectively by the following regulations.

1) Contravariance ($\hat{\partial}^\lambda$) - One set of the symbols with the upper indices $\{x^\mu, u^\nu, A^{\nu\sigma}\}$, as contravariant forms, are the numbers for the $\{\hat{x}\}$ basis of the Y^+ manifold labelled by its identity symbols $\{\hat{\ },^+\}$. "Contravariance" is a formalism in which the nature laws of dynamics operates the event actions $\hat{\partial}^\lambda$, maintains its virtual supremacy of the Y^+ dynamics, and dominates the virtual characteristics under the manifold basis $\hat{x}$.

2) Covariance ($\check{\partial}_\lambda$) - Other set of the symbols with the lower indices (x_m, u_n, A_{ab}), as covariance forms, are the numbers for the $\{\check{x}\}$ basis of the Y^- manifold labelled by its identity symbols of $\{\check{\ },^-\}$. "Covariance" is a formalism in which the nature laws of dynamics performs the event actions $\check{\partial}_\lambda$, maintains its physical supremacy of the Y^- dynamics, and dominates the physical characteristics under the manifold basis $\check{x}$.

Either contravariance or covariance has the same form under a specified set of transformations to the lateral observers within the same or boost basis as a common or parallel set of references for the operational event.

The communications between the manifolds are related through the tangent space of the world planes, regulated as the following operations:

3) Communications ($\hat{\partial}_\lambda$ and $\check{\partial}^\lambda$) - Lowering the operational indices $\hat{\partial}_\lambda$ is a formalism in which the quantitative effects of a virtual event λ under the contravariant Y^+ manifold are projected into, transformed to, or acted on its conjugate Y^- manifold. Rising the operational indexes $\check{\partial}^\lambda$, in parallel fashion, is a formalism in which the quantitative effects of a physical event λ under the covariant Y^- manifold are projected into, transformed to, or recorded at its reciprocal Y^+ manifold.

The dual variances are isomorphic to each other regardless if they are isomorphic to the underlying manifold itself, and form the norm (inner product) of the manifolds or world lines. Because of the reciprocal and contingent nature, the dual manifolds conserve their invariant quantities under a change of transform commutations and transport continuities with the expressional freedom of its underlying basis.

As a part of the universal topology, these mathematical regulations of the dual variances architecturally defines further framework of the event characteristics and its operational structures. In the $Y^\mp$ manifolds, a potential field can be characterized by a scalar function of $\psi \in \{\phi^+, \varphi^+\}$, named as *First Horizon Fields*, to serve as a state environment of entanglements. The derivative to the scalar fields are event operations of their motion dynamics, which generates a tangent space, named as Second *Horizon Fields*.

1. In order to operate the local actions, an event λ exerts its effects of the virtual supremacy within its Y^+ manifold or physical supremacy within its Y^- manifold, giving rise to the second horizon:

$$\hat{\partial}^\lambda \psi = \dot{x}^\mu \partial^\mu \psi \qquad : \dot{x}^\mu = \partial x^\mu / \partial \lambda,\ x^\mu \in Y^+ \tag{3.1}$$

$$\check{\partial}_\lambda \psi = \dot{x}_m \partial_m \psi \qquad : \dot{x}_m = \partial x_m / \partial \lambda,\ x_m \in Y^- \tag{3.2}$$

$$\hat{\partial}^\lambda = (-ic\partial^\kappa \quad \mathbf{u}^+ \nabla) \qquad : \lambda = t,\ \mathbf{u}^+ = \frac{\partial x^r}{\partial t},\ \partial^\kappa = \frac{\partial}{\partial x^0},\ \partial^r = \nabla \tag{3.3}$$

$$\check{\partial}_\lambda = \left(ic\partial_\kappa \quad \mathbf{u}^- \nabla\right) \qquad : \lambda = t,\ \mathbf{u}^- = \frac{\partial x_r}{\partial t},\ \partial_\kappa = \frac{\partial}{\partial x_0},\ \partial_r = \nabla \tag{3.4}$$

The speed $\dot{x}^\mu = \{-ic, \mathbf{u}^+\}$ or $\dot{x}_m = \{ic, \mathbf{u}^-\}$ is the contravariant or covariant velocity, observed from an inertial frame without effects of rotations and transformation. Applying to a point object, it represents a field at each point "*External"* to itself.

2. By lowering the index, the virtual Y^+ actions manifest the first tangent potential $\hat{\partial}_\lambda$ projecting into its opponent basis of the Y^- manifold. Because of the motion, the derivative to the vector x^μ has the changes of both magnitude quantity $\dot{x}_a \partial x^\mu / \partial x_a$ and basis direction $(\dot{x}_a \nabla_a \mathbf{b}^\mu) x^\mu = \dot{x}_a \overset{+}{\Gamma}{}^\sigma_{a\mu} x_\sigma$ transforming from one world plane $\{\mathbf{r} - i\mathbf{k}\}$ to the other $\{\mathbf{r} + i\mathbf{k}\}$. This action redefines the Y^+ event quantities of relativity and creates the *Inertial Boost* $J^+_{\mu a}$ Generators and the *Spiral Torque* $K^+_{\mu a}$ *Coordinators* around a central point, giving rise to the Y^+ tangent rotations of a scalar potential space.

$$\hat{\partial}_\lambda \psi = \dot{x}_a \left(J^+_{\mu a} + K^+_{\mu a}\right) \partial^\mu \psi \quad : J^+_{\mu a} = \frac{\partial x^\mu}{\partial x_a},\ K^+_{\mu a} = \overset{+}{\Gamma}{}^\sigma_{\mu a} x_\sigma \tag{3.5}$$

$$\dot{x}^\mu \mapsto \dot{x}_a \left(J^+_{\mu a} + K^+_{\mu a}\right),\quad \overset{+}{\Gamma}{}^\sigma_{\mu\nu} \equiv \frac{1}{2} g_{\sigma\epsilon} \left(\frac{\partial g^{\epsilon\mu}}{\partial x^\nu} + \frac{\partial g^{\epsilon\nu}}{\partial x^\mu} - \frac{\partial g^{\mu\nu}}{\partial x^\epsilon}\right) \tag{3.6}$$

Likewise for the Y^- actions by raising the index, the Y^- tangent rotations of a scalar potential space can be cloned straightforwardly.

$$\check{\partial}^\lambda \psi = \dot{x}^\alpha \left(J^-_{m\alpha} + K^-_{m\alpha}\right) \partial_m \psi \qquad : J^-_{m\alpha} = \frac{\partial x_m}{\partial x^\alpha},\ K^-_{m\alpha} = \overset{-}{\Gamma}{}^s_{m\alpha} x_s \tag{3.7}$$

$$\dot{x}_m \mapsto \dot{x}^\alpha \left(J^-_{m\alpha} + K^-_{m\alpha}\right),\quad \overset{-}{\Gamma}{}^s_{mn} = \frac{1}{2} g^{se} \left(\frac{\partial g_{em}}{\partial x_n} + \frac{\partial g_{en}}{\partial x_m} - \frac{\partial g_{mn}}{\partial x_e}\right) \tag{3.8}$$

where $g_{\sigma\epsilon}$ or g^{se} is the metrics, the symbol $\overset{\mp}{\Gamma}{}^\mu_{\sigma\nu}$ is an Y^- or Y^+ metric connection, similar but extend the meanings to *Christoffel* symbols, introduced in 1869 [1].

3. Following the tangent curvature, the λ event operates the potential vectors through the second tangent vector of the curvature, giving rise to the *Third Horizon Fields*, shown by the expressions:

$$\hat{\partial}^\lambda V^\mu = \dot{x}^\nu (\partial^\nu V^\mu + \overset{+}{\Gamma}{}^\mu_{\sigma\nu} V^\sigma) \qquad : V^\mu \mapsto \dot{x}^\mu \partial^\mu \psi \tag{3.9}$$

$$\check{\partial}_\lambda V_m = \dot{x}_n (\partial_n V_m + \overset{-}{\Gamma}{}^s_{mn} V_s) \qquad : V_m \mapsto \dot{x}_m \partial_m \psi \tag{3.10}$$

$$\hat{\partial}^\lambda \hat{\partial}^\lambda \psi = (\dot{x}^\nu \partial^\nu)(\dot{x}^\mu \partial^\mu)\psi + \dot{x}^\nu \overset{+}{\Gamma}{}^\sigma_{\mu\nu} \dot{x}^\sigma \partial^\sigma \psi \tag{3.11}$$

$$\check{\partial}_\lambda \check{\partial}_\lambda \psi = (\dot{x}_n \partial_n)(\dot{x}_m \partial_m)\psi + \dot{x}_n \overset{-}{\Gamma}{}^s_{mn} \dot{x}_s \partial_s \psi \tag{3.12}$$

In the tangent space, the scalar fields are given rise to the vector fields.

4. Through the tangent vector of the third curvature, the events $\hat{\partial}_\lambda$ and $\check{\partial}^\lambda$ continuously entangle the vector fields and gives rise to the forth horizon fields, shown by the formulae:

$$\hat{\partial}_\lambda \hat{\partial}^\lambda \psi = \hat{\partial}_\lambda V^\mu = \dot{x}_a \left(J^+_{\nu a} + K^+_{\nu a}\right) \left(\partial^\nu V^\mu + \overset{+}{\Gamma}{}^\mu_{\sigma\nu} V^\sigma\right) \tag{3.13}$$

$$\hat{\partial}^\lambda \hat{\partial}^\lambda V^\mu = \left(\dot{x}^\iota \partial^\iota\right)\left(\dot{x}^\nu \partial^\nu\right) V^\mu + \left(\ddot{x}^\nu \overset{+}{\Gamma}{}^\sigma_{\mu\nu} + \dot{x}^\nu \dot{x}^\iota \partial^\iota \overset{+}{\Gamma}{}^\sigma_{\mu\nu} + \dot{x}^\nu \dot{x}^\iota \overset{+}{\Gamma}{}^\sigma_{\mu\nu} \partial^\iota\right) V^\sigma \tag{3.14}$$

$$\check{\partial}^\lambda \check{\partial}_\lambda \psi = \check{\partial}^\lambda V_m = \dot{x}^\alpha \left(J^-_{m\alpha} + K^-_{m\alpha}\right) \left(\partial_n V_m + \overset{-}{\Gamma}{}^s_{mn} V_s\right) \tag{3.15}$$

$$\check{\partial}_\lambda \check{\partial}_\lambda V_m = \left(\dot{x}_e \partial_e\right)\left(\dot{x}_n \partial_n\right) V_m + \left(\ddot{x}_n \overset{-}{\Gamma}{}^s_{mn} + \dot{x}_n \dot{x}_e \partial_e \overset{-}{\Gamma}{}^s_{mn} + \dot{x}_n \dot{x}_e \overset{-}{\Gamma}{}^s_{mn} \partial_e\right) V_s \tag{3.16}$$

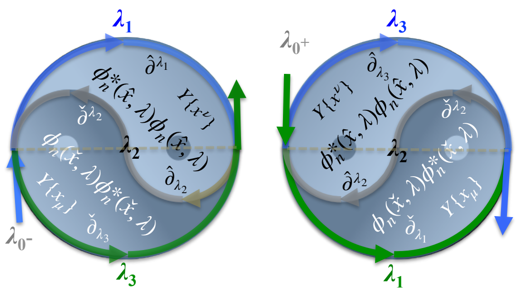
As an integrity, they perform full operational commutations of inertial boosts and torque rotations operated between the Y^-Y^+ world planes. The event processes continue to build up the further operable domain with a variety of the rank-n tensor fields. Systematically, sequentially and simultaneously, a chain of these reactions constitutes various domains, each of which gives rise to the field entanglements.

It is worthwhile to emphasize that *a*) the manifold operators of $\{\partial^\mu, \partial_m\}$, including traditional "operators" of $\{\partial/\partial t, \partial/\partial x_i, \nabla\}$ are exclusively useable as mathematical tools only, and *b*) the tools do not operate or perform by themselves unless they are driven or operated by an event λ, implicitly or explicitly.

IV. LAW OF EVENT EVOLUTIONS

Following *Universal Topology*, world events, illustrated in the Y^-Y^+ flow diagram of Figure 4.1, operate the potential entanglements that consist of the Y^+ supremacy (white background) at a top-half of the cycle and the Y^- supremacy (black background) at a bottom-half of the cycle. Each part is dissolving into the other to form an alternating stream of dynamic flows. Their transformations in between are bi-directional antisymmetric and transported crossing the dark tunnel through a pair of the end-to-end circlets on the center line. Both of the top-half and bottom-half share the common global environment of the state density ρ_n that mathematically represents the ρ_n^+ for the Y^+ manifold and its equivalent ρ_n^- for the Y^- manifold, respectively.

Besides, the left-side diagram presents the event flow acted from the inception of λ_{0-} through $\lambda_1\ \lambda_2\ \lambda_3$ to intact a cycle process for the Y^+ supremacy. In parallel, the right-side diagram depicts the event flow initiated from the initial λ_{0+} through $\lambda_1\ \lambda_2\ \lambda_3$ to complete a cycle process for the Y^- supremacy. The details are described as the following:



$W^+ : (\hat{\partial}^{\lambda_1} \to \hat{\partial}_{\lambda_2}), (\check{\partial}^{\lambda_2} \to \check{\partial}_{\lambda_3})$ $\qquad$ $W^- : (\check{\partial}_{\lambda_1} \to \check{\partial}^{\lambda_2}), (\hat{\partial}^{\lambda_2} \to \hat{\partial}_{\lambda_3})$

Figure 4.1: Event Flows of Y^-Y^+ Evolutional Processes

1) Visualized in the left-side of Figure 4.1, the transitional event process between virtual and physical manifolds involves a cyclic sequence throughout the dual manifolds of the environment: incepted at λ_{0-}, the event actor produces the virtual operation $\hat{\partial}_{\lambda_1}$ in $Y\{x^\nu\}$ manifold (the left-hand blue curvature) projecting $\hat{\partial}^{\lambda_2}$ to and

transforming into its physical opponent $\check{\partial}^{\lambda_2}$ (the tin curvature transforming from the left-hand into right-hand), traveling through $Y\{x_\mu\}$ manifold (the right-hand green curvature), and reacting the event $\check{\partial}_{\lambda_3}$ back to the actor.

2) As a duality in the parallel reaction, exhibited in the right-side of Figure 4.1, initiated at $\lambda_{0}+$, the event actor generates the physical operation $\check{\partial}_{\lambda_1}$ in $Y\{x_\mu\}$ manifold (the right-hand green curvature) projecting $\check{\partial}^{\lambda_2}$ to and transforming into its virtual opponent $\hat{\partial}^{\lambda_2}$ (the tin curvature transforming from right-hand into left-hand), traveling through $Y\{x^\nu\}$ manifold (the left-hand blue curvature), and reacting the event $\hat{\partial}_{\lambda_3}$ back to the actor.

With respect to one another, the two sets of the Universal Event processes, cycling at the opposite direction simultaneously, formulate the flow charts in the following mathematical expressions:

$$W^+ : (\hat{\partial}^{\lambda_1} \to \hat{\partial}_{\lambda_2}), (\check{\partial}^{\lambda_2} \to \check{\partial}_{\lambda_3}) \tag{4.1}$$

$$W^- : (\check{\partial}_{\lambda_1} \to \check{\partial}^{\lambda_2}), (\hat{\partial}^{\lambda_2} \to \hat{\partial}_{\lambda_3}) \tag{4.2}$$

This pair of the interweaving system pictures an outline of the internal commutation of dark energy and continuum density of the entanglements. It demonstrates that the two-sidedness of any event flows, each dissolving into the other in alternating streams, operate a life of situations, movements, or actions through continuous helix-circulations aligned with the universe topology, which lay behind the context of the main philosophical interpretation of *World Equations*.

Artifact** 4.1: **Motion Operations. As a natural principle of motion dynamics, one of the flow processes dominates the intrinsic order, or development, of virtual into physical regime, while, at the same time, its opponent dominates the intrinsic annihilation or physical resources into virtual domain. Applicable to world expressions of (4.1)-(4.2), the principle of least-actions derives a set of the *Motion Operations*:

$$\check{\partial}^-\left(\frac{\partial W}{\partial(\hat{\partial}^+\phi)}\right) - \frac{\partial W}{\partial \phi} = 0 \quad : \check{\partial}^- \in \{\check{\partial}_\lambda, \check{\partial}^\lambda\}, \hat{\partial}^+ \in \{\hat{\partial}^\lambda, \hat{\partial}_\lambda\} \tag{4.3}$$

$$\hat{\partial}^+\left(\frac{\partial W}{\partial(\check{\partial}^-\phi)}\right) - \frac{\partial W}{\partial \phi} = 0 \quad : W \in \{W^\mp\}, \phi \in \{\phi_n^\pm, \varphi_n^\pm\} \tag{4.4}$$

This set of dual formulae extends the philosophical meaning to the *Euler-Lagrange* [3] *Motion Equation* for the actions of any dynamic system, introduced in the 1750s. The new sets of the variables of $\phi_n^\mp$ and the event operators of $\check{\partial}^-$ and $\hat{\partial}^+$ signify that both manifolds maintain equilibria formulations from each of the motion extrema, simultaneously driving a duality of physical and virtual dynamics.

Artifact** 4.2: **Geodesic Routing. Unlike a single manifold space, where the shortest curve connecting two points is described as a parallel line, the optimum route between two points of a curve is connected by the tangent transportations of the Y^- and Y^+ manifolds. As an extremum of event actions on a set of curves, the rate of divergence of nearby geodesics determines curvatures that is governed by the equivalent formulation of geodesic deviation for the shortest paths on each of the world planes:

$$\ddot{x}^\mu + \overset{+}{\Gamma}{}^\mu_{\alpha\beta}\dot{x}^\alpha\dot{x}^\beta = 0 \qquad \ddot{x}_m + \overset{-}{\Gamma}{}^m_{ab}\dot{x}_a\dot{x}_b = 0 \tag{4.5}$$

This set extends a duality to and is known as *Geodesic Equation* [4], where the motion accelerations of $\ddot{x}^\mu$ and $\ddot{x}_m$ are aligned in parallel to each of the world lines. It states that, during the inception of the universe, the tangent vector of the virtual Y^-Y^+ energies to the geodesic entanglements is either unchanged or parallel transport as an object moving along the world planes that creates the inertial transform generators and twist transport torsions to emerge a reality of the world.

V. WORLD EQUATIONS

In mathematical analysis, a complex manifold yields a holomorphic operation and is complex differentiable in a neighborhood of every point in its domain, such that an operational process can be represented as an infinite sum of terms:

$$f(\lambda) = f(\lambda_0) + f'(\lambda_0)(\lambda-\lambda_0)\cdots + f^n(\lambda_0)(\lambda-\lambda_0)^n/n! \tag{5.1}$$

known as the *Taylor* and *Maclaurin* series [2], introduced in 1715. Normally, a global event generates a series of sequential actions, each of which is associated with its opponent reactions, respectively and reciprocally. For any event operation as the functional derivatives, the sum of terms are calculated at an initial state λ_0 and explicitly reflected by the *Event Operations* $\dot{\lambda}_i \mapsto \dot{\partial}_{\lambda_i}$ in the dual variant forms:

$$f(\lambda) = f_0 + \kappa_1\dot{\partial}_{\lambda_1} + \kappa_2\dot{\partial}_{\lambda_1}\dot{\partial}_{\lambda_2} + \kappa_3\dot{\partial}_{\lambda_1}\dot{\partial}_{\lambda_2}\dot{\partial}_{\lambda_3}\ \cdots + \kappa_n\dot{\partial}_{\lambda_1}\dot{\partial}_{\lambda_2}\ldots\dot{\partial}_{\lambda_n} \tag{5.2}$$

$$\kappa_n = f^n(\lambda_0)/n! \qquad \dot{\lambda}_i \in \{\dot{\partial}\}=\{\check{\partial}_\lambda, \check{\partial}^\lambda, \hat{\partial}^\lambda, \hat{\partial}_\lambda\} \tag{5.3}$$

where κ_n is the coefficient of each order n. The event states of world planes are open sets and can either rise as subspaces transformed from the other horizon or remain confined as independent existences within their own domain, as in the settings of $Y^\mp$ manifolds of the world planes.

The operational function $f(\lambda)$ for an event λ involves the state densities ρ_n and spacetime exposition Γ of a system with N objects or particles. Assuming each of the particles is in one of three possible states: |-⟩, |+⟩, and |o⟩, the system has N_n^+ and N_n^- particles at non-zero charges with their state functions of ϕ_n^+ or ϕ_n^- confineable to the respective manifold $Y^\pm$. Therefore, the horizon functions of the system can be expressed by:

$$W_c = k_w\int W_b d\Gamma, \qquad W_b = \sum\nolimits_n h_n W_a, \qquad W_a = f(\lambda)\rho_n \tag{5.4}$$

$$\rho_n = \phi_n^+(\hat{x},\lambda)\phi_n^-(\check{x},\lambda), \qquad h_n = N_n^\pm/N \quad : \hat{x},\check{x} \subset Y^\pm\{\mathbf{r} \mp i\,\mathbf{k}\} \tag{5.5}$$

where h_n is a horizon factor, $N_n^\pm/N$ are percentages of the Y^-Y^+ particles, and k_w is defined as a world constant. During space and time dynamics, the density $\phi_n^-\phi_n^+$ is incepted at $\lambda = \lambda_0$ and followed by a sequence of the evolutions $\lambda_n = \dot{\partial}_{\lambda_n}$. This process engages and applies a series of the event operations of equations (5.2) to the equations of (5.4) in the form of the following expressions, named as ***World Equations***:

$$W = k_w\int d\Gamma\sum_n h_n\left[W_n^\pm + \kappa_1\dot{\partial}_{\lambda_1} + \kappa_2\dot{\partial}_{\lambda_2}\dot{\partial}_{\lambda_1}\cdots\right]\phi_n^+\phi_n^- \tag{5.7}$$

where $W_n^\pm \equiv W(\hat{x}\,|\,\check{x},\lambda_0)$ is the Y^+ or Y^- ground environment or an initial potential of a system, respectively. Because an event process λ_n is operated in complex composition of the virtual and physical coordinates, it yields a linear function in a form of operational addition: $f(\partial_\kappa + \partial_r) = f(\partial_\kappa) + f(\partial_r)$, where the $\{\mathbf{r},\mathbf{k}\}$ vectors of each manifold $Y^\mp\{\mathbf{r} \pm i\,\mathbf{k}\}$ constitute their orthogonal coordinate system $\mathbf{r}\cdot\mathbf{k} = 0$.

As the topological framework, various horizons are defined as, but not limited to, timestate, microscopic and macroscopic regimes, each of which is in a separate zone, emerges with its own fields, and aggregates or dissolves into each other as the interoperable neighborhoods, systematically and simultaneously. Through the Y^-Y^+ communications, the expression of the tangent vectors defines and gives rise to each of the horizons.

Artifact** 5.1: **First Horizon. The field behaviors of individual objects or particles have their potentials of the timestate functions in the form of, but not limited to, the dual densities:

$$\rho_\phi^+ = \phi(\hat{x},\lambda)\,\varphi(\check{x},\lambda) \qquad : \phi^+ \equiv \phi(\hat{x},\lambda), \varphi^- \equiv \varphi(\check{x},\lambda) \tag{5.8}$$

$$\rho_\phi^- = \phi(\check{x},\lambda)\,\varphi(\hat{x},\lambda) \qquad : \phi^- \equiv \phi(\check{x},\lambda), \varphi^+ \equiv \varphi(\hat{x},\lambda) \tag{5.9}$$

This horizon is confined by its neighborhoods of the ground fields and second horizons, which is characterizable by the scalar objects of $\phi^\pm$ and $\varphi^\pm$ fields of the ground horizon, individually, and reciprocally.

Artifact** 5.2: **Second Horizon. The effects of aggregated objects has their commutative entanglements of the microscopic functions in forms of

$$\mathbf{f}_n^+ = \kappa_{\mathbf{f}}^+\dot{\partial}\rho_\phi^+ = \frac{\hbar c}{2}\left(\varphi_n^-\frac{\dot{x}^\nu}{E_n^+}\partial^\nu\phi_n^+ + \phi_n^+\frac{\dot{x}_\nu}{E_n^-}\partial_\nu\varphi_n^-\right) \tag{5.10}$$

$$\mathbf{f}_n^- = \kappa_{\mathbf{f}}^-\dot{\partial}\rho_\phi^- = \frac{\hbar c}{2}\left(\varphi_n^+\frac{\dot{x}_m}{E_n^-}\partial_m\phi_n^- + \phi_n^-\frac{\dot{x}^m}{E_n^+}\partial^m\varphi_n^+\right) \tag{5.11}$$

defined as *Fluxion Fields*. This horizon summarizes the timestate functions $\mathbf{f}^\pm = \sum \mathbf{f}_n^\pm$, confined between the first and third horizons.

Artifact** 5.3: **Third Horizon. The integrity of massive objects characterizes their global motion dynamics of the macroscopic matrices and tensors through an integration of, but not limited to, the derivative to microscopic fields of densities and fluxions, defined as *Force Fields*:

$$\mathbf{F}^{\pm} = \kappa_{\mathbf{F}}^{\pm} \int \rho_a \dot{\partial} \mathbf{f}^{\pm} d\,\Gamma \qquad : \dot{\partial} \in \{\check{\partial}_{\lambda}, \hat{\partial}^{\lambda}\} \tag{5.12}$$

where $\kappa_{\mathbf{F}}^{+}$ or $\kappa_{\mathbf{F}}^{-}$ is a coefficient. This horizon is confined by its neighborhoods of the second and fourth horizons and characterizable by the tensor fields of $\dot{\partial}\mathbf{f}_m$ and $\dot{\partial}\mathbf{f}^{\mu}$.

The horizon ladder continuously accumulates and gives a rise to the next objects in form of a ladder hierarchy:

$$\iiiint \cdots \rho_c \dot{\partial} \int \rho_b \dot{\partial} \mathbf{F}^{\pm} d\,\Gamma \mapsto \mathbf{W}_x^{\pm} \tag{5.13}$$

They are orchestrated into groups, organs, globes or galaxies.

VI. UNIVERSAL FIELD EQUATIONS

The potential entanglements is a fundamental principle of the real-life streaming such that one constituent cannot be fully described without considering the other. As a consequence, the state of a composite system is always expressible as a sum of products of states of each constituents. Under the law of event operations, they are fully describable by the mathematical framework of the dual manifolds.

During the events of the virtual supremacy, a chain of the event actors in the flows of Figure 4.1 and equations (4.1)-(4.2) can be shown by and underlined in the sequence of the following processes:

$$W^{+} : (\hat{\partial}^{\lambda_1} \to \underbrace{\hat{\partial}_{\lambda_2}}), (\check{\partial}^{\lambda_2} \to \underbrace{\check{\partial}_{\lambda_3}}); \; W^{-} : (\check{\partial}_{\lambda_1} \to \underline{\check{\partial}^{\lambda_2}}), (\hat{\partial}^{\lambda_2} \to \underline{\hat{\partial}_{\lambda_3}}) \tag{6.1}$$

From the event actors $\hat{\partial}_{\lambda_2}$ and $\check{\partial}_{\lambda_3}$, the *World Equations* (5.4) becomes:

$$W_a^{+} = \left(W_n^{+} + \kappa_1 \underbrace{\hat{\partial}_{\lambda_2}} \right) \phi_n^{+} \phi_n^{-} + \kappa_2 \underbrace{\check{\partial}_{\lambda_3}} \left(\phi_n^{+} \hat{\partial}_{\lambda_2} \phi_n^{-} + \phi_n^{-} \hat{\partial}_{\lambda_2} \phi_n^{+} \right) \ldots \tag{6.2}$$

Meanwhile the event actors $\hat{\partial}^{\lambda_1}$ and $\check{\partial}^{\lambda_2}$ turn World Equations into:

$$W_a^{+^*} = \left(W_n^{+} + \kappa_1 \underbrace{\hat{\partial}^{\lambda_1}} \right) \varphi_n^{+} \varphi_n^{-} + \kappa_2 \underbrace{\check{\partial}^{\lambda_2}} \left(\varphi_n^{+} \hat{\partial}^{\lambda_1} \varphi_n^{-} + \varphi_n^{-} \hat{\partial}^{\lambda_1} \varphi_n^{+} \right) \cdots \tag{6.3}$$

where $W_n^{+} = W_n^{+}(\mathbf{r}, t_0)$ is the time invariant Y^{+}-energy fluxion. Rising from the opponent fields of ϕ_n^{-} or φ_n^{-}, the dynamic reactions under the Y^{-} manifold continuum give rise to the *Motion Operations* of the Y^{+} fields ϕ_n^{+} or φ_n^{+} approximated at the first and second orders of perturbations in term of the above *World Equation*, as an example:

$$\frac{\partial W_a^{+}}{\partial \phi_n^{-}} = W_n^{+}\left(\mathbf{x}, t_0\right) \phi_n^{+} + \kappa_1 \hat{\partial}_{\lambda_2} \phi_n^{+} + \kappa_2 \check{\partial}_{\lambda_3} \hat{\partial}_{\lambda_2} \phi_n^{+} \tag{6.4}$$

$$\check{\partial}^{\lambda_2}\left(\frac{\partial W_a^{+}}{\partial(\underbrace{\hat{\partial}_{\lambda_2}} \; \phi_n^{-})}\right) = \underline{\check{\partial}^{\lambda_2}} \left(\kappa_1 + \kappa_2 \check{\partial}_{\lambda_3} \right) \phi_n^{+} \tag{6.5}$$

$$\hat{\partial}_{\lambda_3}\left(\frac{\partial W_a^{+}}{\partial(\underbrace{\check{\partial}_{\lambda_3}} \; \phi_n^{-})}\right) = \underline{\hat{\partial}_{\lambda_3}} \left(\kappa_2 \hat{\partial}_{\lambda_2} \phi_n^{+} \right) \tag{6.6}$$

where the potentials of $\hat{\partial}_{\lambda_2}\phi_n^{-}$ and $\check{\partial}_{\lambda_3}\phi_n^{-}$ give rise simultaneously to their opponent's reactors of the physical to virtual transformation $\check{\partial}^{\lambda_2}$ and the physical reaction $\hat{\partial}_{\lambda_3}$, respectively. From these interwoven relationships, the motion operations (4.3)-(4.4) determine a pair of partial differential equations of the $Y^{-}Y^{+}$ state fields ϕ_n^{+} and φ_n^{+} under the supremacy of virtual dynamics at the $Y\{x^{\nu}\}$ manifold:

$$\kappa_1 \left(\check{\partial}^{\lambda_2} - \hat{\partial}_{\lambda_2} \right) \phi_n^{+} + \kappa_2 \left(\check{\partial}_{\lambda_3} \check{\partial}^{\lambda_2} + \hat{\partial}_{\lambda_3} \hat{\partial}_{\lambda_2} - \check{\partial}_{\lambda_3} \hat{\partial}_{\lambda_2} \right) \phi_n^{+} = W_n^{+} \phi_n^{+} \tag{6.7}$$

$$\kappa_1 \left(\check{\partial}_{\lambda_1} - \hat{\partial}^{\lambda_1} \right) \varphi_n^{+} + \kappa_2 \left(\check{\partial}^{\lambda_2} \check{\partial}_{\lambda_1} + \hat{\partial}^{\lambda_2} \hat{\partial}^{\lambda_1} - \check{\partial}^{\lambda_2} \hat{\partial}^{\lambda_1} \right) \varphi_n^{+} = W_n^{+} \varphi_n^{+} \tag{6.8}$$

giving rise to the Y^{+} *General Fields* from each respective opponent during their physical interactions.

In the events of the physical supremacy in parallel fashion, a chain of the event actors in the flows of Figure 4.1 can be shown by the similar sequence of the following processes:

$$W^{-} : (\underline{\check{\partial}_{\lambda_1}} \to \check{\partial}^{\lambda_2}), (\underline{\hat{\partial}^{\lambda_2}} \to \hat{\partial}_{\lambda_3}) \; ; \; W^{+} : (\underbrace{\hat{\partial}^{\lambda_1}} \to \hat{\partial}_{\lambda_2}), (\underbrace{\check{\partial}^{\lambda_2}} \to \check{\partial}_{\lambda_3}) \tag{6.9}$$

$$W_a^{-} = \left(W_n^{-} + \kappa_1 \underline{\check{\partial}_{\lambda_1}} \right) \phi_n^{+} \phi_n^{-} + \kappa_2 \underline{\hat{\partial}^{\lambda_2}} \left(\phi_n^{+} \check{\partial}_{\lambda_1} \phi_n^{-} + \phi_n^{-} \check{\partial}_{\lambda_1} \phi_n^{+} \right) \cdots \tag{6.10}$$

$$W_a^{-^*} = \left(W_n^{-} + \kappa_1 \check{\partial}^{\lambda_2} \right) \varphi_n^{+} \varphi_n^{-} + \kappa_2 \hat{\partial}_{\lambda_3} \left(\varphi_n^{+} \check{\partial}^{\lambda_2} \varphi_n^{-} + \varphi_n^{-} \check{\partial}^{\lambda_2} \varphi_n^{+} \right) \cdots \tag{6.11}$$

where $W_n^{-} = W_n^{-}(\mathbf{r}, t_0)$ is the time invariant Y^{-}-energy fluxion. Rising from its opponent fields of ϕ_n^{+} or φ_n^{+} in parallel fashion, the dynamic reactions under the Y^{+} manifold continuum give rise to the *Motion Operations* of the Y^{-} state fields ϕ_n^{-} or φ_n^{-}, which determines a linear partial differential equation of the state function ϕ_n^{-} or φ_n^{-} under the supremacy of physical dynamics at the $Y\{x_m\}$ manifold:

$$\kappa_1 \left(\hat{\partial}^{\lambda_1} - \check{\partial}_{\lambda_1} \right) \phi_n^{-} + \kappa_2 \left(\hat{\partial}^{\lambda_2} \hat{\partial}^{\lambda_1} + \check{\partial}^{\lambda_2} \check{\partial}_{\lambda_1} - \hat{\partial}^{\lambda_2} \check{\partial}_{\lambda_1} \right) \phi_n^{-} = W_n^{-} \phi_n^{-} \tag{6.12}$$

$$\kappa_1 \left(\hat{\partial}_{\lambda_2} - \check{\partial}^{\lambda_2} \right) \varphi_n^{-} + \kappa_2 \left(\hat{\partial}_{\lambda_3} \hat{\partial}_{\lambda_2} + \check{\partial}_{\lambda_3} \check{\partial}^{\lambda_2} - \hat{\partial}_{\lambda_3} \check{\partial}^{\lambda_2} \right) \varphi_n^{-} = W_n^{-} \varphi_n^{-} \tag{6.13}$$

giving rise to the Y^{-} General Fields from each of the respective opponents during their virtual interactions.

A homogeneous system is a trace of diagonal elements where an observer is positioned external to or outside of the objects. The source of the fields appears as a point object and has the uniform *Conservations* at every point without irregularities in field strength and direction, regardless of how the source itself is constituted with or without its internal or surface twisting torsions.

Whereas, a heterogeneous system is the off-diagonal elements of the symmetric tensors where an observer is positioned internal to or inside of the objects, and the duality of virtual annihilation and physical reproduction are balanced to form the local *Continuity* or *Invariance*.

The two pairs of the dynamic fields (6.7)-(6.8) and (6.12)-(6.13) are operated generically under first horizon of the *World Events*. Together, the four formulae are named as ***First Universal Field Equations***, which are fundamental and general to all fields of natural evolutions.

CONCLUSION

Universal Topology has revealed a set of the following discoveries or groundbreakings:

1) To align closely with life-streams of our natural world, the ***Dual complex manifolds*** are established that overcomes the limitations of a single spacetime manifold.

2) ***Two pairs of the potential fields*** lies at the heart of the field theory for the fundamental interactions among the dark energies.

3) ***Mathematical Framework*** is imperatively regulated on a new theoretical foundation by the dual variances to intimately mimic event actions of transform and transport processes.

4) ***Law of Event Evolutions*** lies at the heart of the field entanglements reciprocally and consistently as the fundamental flows of interactions among dark energies for field entanglements.

5) ***Motion Operations*** are further regulated on and performed with a new theoretical foundation of the dual events intimately mimic operational actions on the geodesic covertures, extend the meanings to the *Euler-Lagrange Motion Equation.*

6) ***World Equations*** align a series of the infinite sequential actions concisely with potential-streams of the natural dynamics that overcome the limitations of *Lagrangian* mechanics.

7) ***First Universal Field Equations*** of (6.7)-(6.8) and (6.12)-(6.13) are discovered as a set of general formulae, which lies at the heart of and is grounded for all horizon fields.

As a result, it has laid out a ground foundation towards a unified physics that give rise to the fields of quantum, photon, electromagnetism, graviton, gravitation, thermodynamics, cosmology, and beyond.

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