___ *UNIFIED THEORY* ___

The Fundamental Code of helicoidal interactions and the inductive principles

(mathematical and conceptual Core)

*** *summary* ***

The Unified Theory offers a kinematic and geometric synthesis of self-organized helicoidal phenomena, formulating for the first time ***a universal state equation*** *and an* ***integral interaction/induction equation****. Together, these describe the continuity of interactions through transformation and adaptation processes of all helicoidal flow systems—vortex-type or vortex filaments—at any scale.*

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1. Fundamental Constants and the Kinematic State Equation of Helicoidal Flows

Any coherent helicoidal flow is characterized **by three fundamental const**ants (Preda):

$$\mathbf{C_c = \frac{dQ}{dt}}, \quad \mathbf{C_f = r v_t^2}, \quad \mathbf{C_e = r^3 f^2}$$

These constants, under geometric coherence, are simultaneously conserved, endowing helicoidal transport with a **set of flow information**. Remaining constant, they naturally add an essential property: **memory**. Their ratio defines the **kinematic coupling constant**:

$$\boldsymbol{\alpha = \frac{C_f C_e}{C_c^2}}$$

This determines the global state of dynamic equilibrium. This relation constitutes the **kinematic state equation** of the tornado, the fundamental expression of internal coherence between flow rate, shape, and cyclicity.

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2. Fundamental Interactions Between Any Two Adjacent Helicoidal Flows

Helicoidal systems do not exist in isolation; they continuously interact through four **mechanisms of kinematic interaction/induction**, described by four kernels of the global geometrodynamic operator:

$$\boldsymbol{\mathcal{K} = K_{CA} + K_{CM} + K_{CC} + K_{TC}}$$

Each kernel defines a distinct geometric relationship between a source and the adjacent induced flow, between a systemic excitation and the response of the neighboring system (function-dependent):

Type of Induction	Symbol	Kinematic Nature	Geometric Character
C–A *(cylinder–attractor)*	K_{CA}	*Genesis, bichiral, pure axial interaction*	*primary origin, axial direction, predominantly bosonic*
C–M *(cylinders–multiple)*	K_{CM}	*Bichiral, head-to-head axial interaction*	*axial tornado chain, predominantly fermionic*
C–C *(cylinder–cylinder)*	K_{CC}	*Bosonic, antichiral*	*lateral axial bundle, homomorphic structure*
T–C *(torus–cylinder)*	K_{TC}	*Fermionic, local*	*toroidal self-closure, heteromorphic structure*

Through these four forms of interaction/induction, helical systems can **generate, self-concatenate, self-replicate, or self-reflect** their own flows, achieving a multidimensional kinematic continuity.

Depending on the nature of the interaction, we have **four specific kernels**, each corresponding to a distinct type of interaction or induction:

K_{CA}— Genesis Kernel (Cylinder–Attractor)

→ describes how an **external potential gradient (attractor)** induces an initial internal helicoidal flow. Displays bichirality through imbalances and triggers.

Primary Role: Genesis, initiation of helical flow.

The C–A kernel describes the process of primary induction, by which an axial attractor (A) generates a cylindrical flow (C) that becomes the first coherent form of a helical flow. It is the only pure asymmetric kernel, because the induction is unidirectional – from the outside (attractor) to the inside (flow).

Properties:

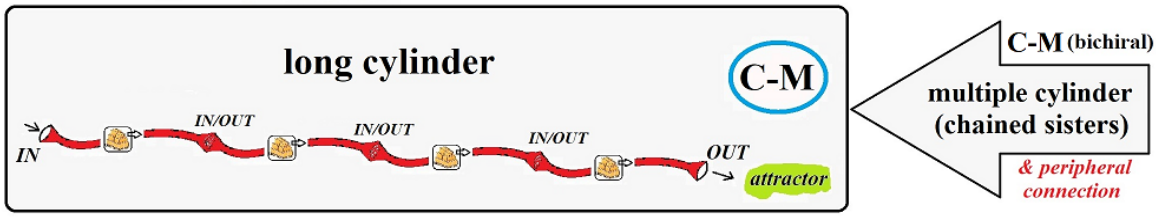
- **Type**: mathematically asymmetric, unique genesis function
- **Induction direction**: attractor → flow (A → C)
- **State**: unstable (nucleative, transient)
- **Primary function**: emergence of first coherent flow from external gradient
- **Secondary functions**: initiation of fundamental constants (Cc, Cf, Ce), establishment of first preferential flow axis, rapid transition to other forms (M–C, C–C, T–C)

Kinematic Interpretation:

C–A is the “dynamic spark,” the genesis of any helicoidal structure. It defines cinematic time zero and is always ephemeral: immediately after formation, the flow seeks new equilibrium through transformation, metamorphosis, adaptation.

K_{CM}— Multiple Axial Coupling Kernel (Cylinder–Multiple)

→ describes the **fermionic interaction**, where monochiral tornadoes couple end-to-end, forming extremely long coherent longitudinal chains. They exhibit fermionic-dominated bichirality, and have weak force. (speed tornadoes)



Primary Role: Axial extension, formation of fermionic chains.

The M–C kernel expresses the end–end coupling between two or more cylindrical flows having the same chirality and the same fundamental constants. It is the mechanism of axial self-extension of tornadoes, forming extremely long fermionic structures (monochiral, continuous). It is a dual-function kernel, it can be both inductive (creating new tornadoes at the end) and collective (inserting existing tornadoes).

Properties:

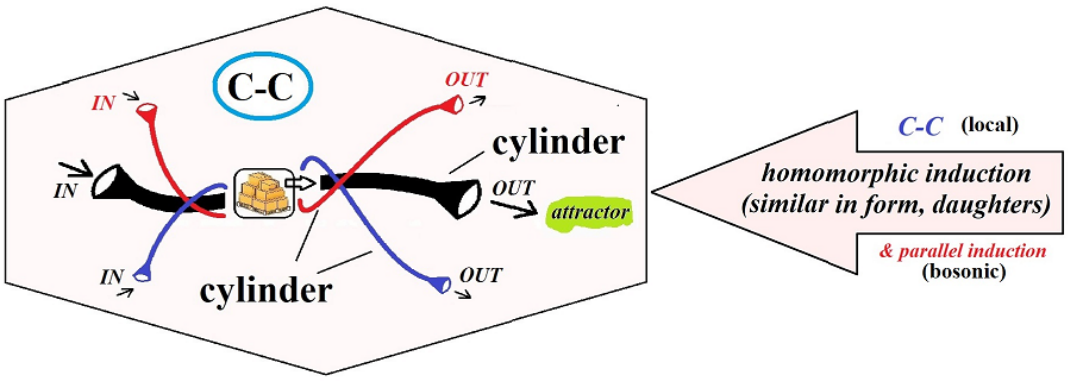
- **Type**: axially symmetric, axial aggregator, dual-function
- **Induction direction**: bidirectional ($C_1 \leftrightarrow C_2$), perturbations travel up and down the axis
- **State**: stable, longitudinal
- **Primary function**: self-expanding helical chains, axial advance through the propagation medium
- **Secondary functions**: kinematic, peripheral concatenation, coherent propagation of fundamental constants (Cc, Cf, Ce), insertion of fermionic structures (end-to-end flows) by coupling and decoupling other compatible existing flows

Kinematic Interpretation:

M–C ensures cinematic continuity. If C–A births the flow, M–C prolongs it—without geometric or energetic discontinuity. It enables the lifespan of the phenomenon.

K_{CC}— Aggregation Kernel, Lateral Coupling (Cylinder–Cylinder)

→ expresses the **bosonic interaction**, where antichiral flows are induced that stick their axes together and form a coherent bundle. New, homomorphic, strongly force helical structures can be formed, these being torsion tornadoes.xpresses bosonic interaction where antichiral flows align their axes and form coherent bundles.



Primary Role: Lateral aggregation, formation of bosonic bundles.

The C–C kernel describes the interaction of parallel axes of helical flow. Two or more tornadoes can replicate laterally or aggregate into a coherent bundle. It is a dual-behavior kernel, because it can be both inductive (creating new arms) and collective (joining existing arms).

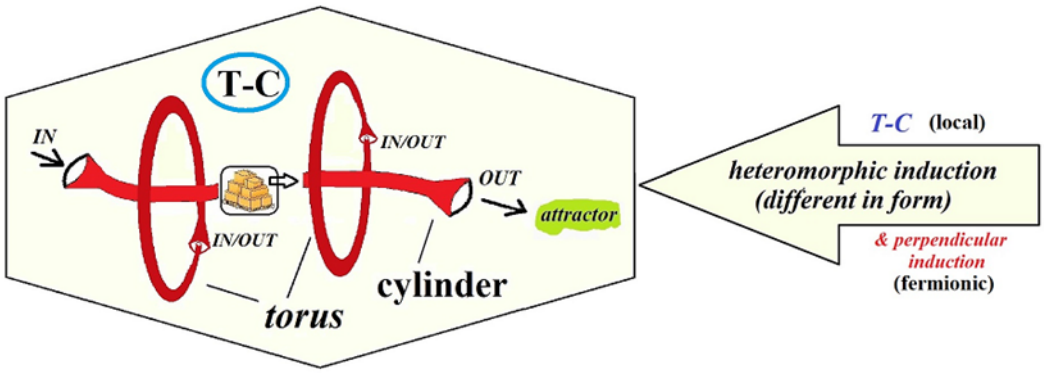
Properties:

- **Type**: mutual (dual behavior), mathematically symmetric transversally and axially, lateral aggregator
- **Induction direction:** lateral, between parallel axes
- **State**: stable in bosonic regime
- **Primary function**: replication via lateral induction, describes living beings
- **Secondary functions**: axial coalescence (formation of tornado bunches), spatial compaction (formation of flow trunks), kinematic stabilization by antichiral mediation, transmits disturbances both on axes and between axes (entanglement), the flow ensemble is divided into three morphological zones; mirrored arms (IN), a trunk zone and mirrored legs (OUT).

Kinematic Interpretation: C–C is the kernel of collective coherence. It enables volume increase and bundle formation—true bosonic structures. It explains how a tornado becomes a complex system "with arms and legs," while preserving the coupling constant α.

K_{TC}— Transversal Induction Kernel, Coiling (Torus–Cylinder)

→ defines **toroidal induction**, where an axial flow generates a toroidal flow around it, maintaining chirality. New, heteromorphic helical structures emerge.



Primary Role: Transverse balancing, toroidal stabilization, knotty aggregation.

The T–C kernel describes the perpendicular interaction between a cylindrical and a toroidal flow. It is the mechanism by which an axial flow generates a transverse flow – forming a torus around the main axis. At the same time, the formed torus can induce a reverse axial flow, which makes this kernel self-symmetric.

Properties:

- **Type**: auto-symmetric, local transversal aggregator
- **Induction direction**: always perpendicular to main axis
- **State**: balancing, superstable
- **Primary function**: induction of toroidal flow around axial flux
- **Secondary functions**: cinematic balancing and impulse redistribution, inverse induction (torus → cylinder), global stabilization, emergence of nodes and closed toroidal circuits

Kinematic Interpretation:

T–C is the kernel of universal balancing. It closes the system, allowing energy and impulse exchange between axial and toroidal components. It makes the system self-regulating and able to return to equilibrium without losing cinematic coherence.

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3. Principle of Geometrodynamic Transformation: Flow Geometry Adaptation

The Law of Geometrodynamic Transformation unifies all these processes under a single statement:

"Any helicoidal flow continuously adapts its internal geometry to conserve the fundamental constants; and when such adaptation becomes impossible, the system undergoes a spontaneous geometric transformation, transitioning into a new kinematic state characterized by its own constants."

This law defines the universal **mechanism of self-organization and regeneration**:

Geometry is the language through which dynamics maintains coherence, and geometric metamorphosis is the signature of kinematic state change.

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4. The Darwinism of Helicoidal Geometrodynamics in the Unified Theory

(Quantum Darwinism)

Within the Unified Theory, the cinematic state equation of any helicoidal flow

$$\boldsymbol{\alpha = \frac{C_f \cdot C_e}{C_c^2}}$$

and the interaction kernels (C–A, C–C, M–C, and T–C) define a profound evolutionary paradigm, in which each helicoidal flow behaves as a system capable of maintaining its cinematic identity only through continuous geometric adaptation. The **conservation of fundamental constants** represents a central element of this paradigm: they function as an **internal cinematic memory**, **an invariant information** carried by the flow independently of spatial transformations, environmental **changes, or configuration modifications induced by the kernels.**

This memory is not passive, but conditions the dynamics: any vortex is compelled to submit to a geometrodynamic pressure of adaptation, **adjusting its internal geometry** so as to conserve its own set of fundamental constants, thereby ensuring **continuous cinematic coherence**. When such adaptation becomes impossible, the system can no longer maintain **coherence** and enters a state of **geometrodynamic decoherence**, a phenomenon interpreted as "leaving the system": an irreversible geometric transformation in which the vortex tube loses its previous cinematic identity and adopts a new set of fundamental constants.

The interaction kernels play an essential role in this process. They modulate the pressure of adaptation through four distinct modes — axial genesis (C–A), replication/parallelization (C–C), end-to-end concatenation (M–C), and toroidal induction (T–C) — each producing specific **geometric deformations that test the resilience of the internal memory**. Only those helicoidal structures capable of coherently mapping their geometry onto the values of their own fundamental constants survive these evolutionary

processes of interaction; the others fall into decoherence and are excluded from the chain of cinematic evolution.

Thus, the global dynamics of the system can be interpreted as a quantum **Darwinism of the helicoidal-geometrodynamic type**: **selection does not operate upon mass or energy, but upon cinematic coherence and the capacity for self-preservation of the internal memory**.

Geometric adaptability becomes the fundamental criterion of survival, while geometric decoherence marks the failure of the system to sustain this identity. In this interpretation, the evolution of helicoidal structures is not merely a physical process, but an emergent mechanism of self-organization and selection of coherent forms, determined by the law of geometrodynamic adaptation and by the action of coupling kernels.

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5. Fundamental System of the Unified Theory

***The result of theoretical synthesis is expressed through the fundamental system*:**

$$\begin{cases} \textbf{(I)} & \alpha = \dfrac{C_f C_e}{C_c^2}, \\ \textbf{(II)} & \Psi(x,t) = \int (K_{CA} + K_{CM} + K_{CC} + K_{TC})\, \Psi(x',t')\, dx'\, dt'. \end{cases}$$

(I) The kinematic state equation of helicoidal flow defining the coupling constant
(II) The geometrodynamic interaction equation between two adjacent helicoidal flows

The first equation defines the internal identity of each tornado, and the second describes the universal mechanism of interaction and transformation of the ensemble. Together, they form the mathematical and conceptual core of the Unified Theory—a framework where kinematics and geometry become reciprocal expressions of the same dynamic reality.

All four kernels act within the same cinematic framework, each representing a particular form of interaction between two adjacent helicoidal flows:

- ✓ ***C–A*** *initiates the system*
- ✓ ***M–C*** *extends it axially*
- ✓ ***C–C*** *multiplies it laterally*
- ✓ ***T–C*** *balances it transversally*

The state equation and kernel equation *form a* ***closed system of geometrodynamic self-organization****, in which the Preda constants remain* ***conserved****. Each kernel can function as a* ***genesis, induction, or interaction operator****, without requiring further extensions. The interactions of helicoidal flows, grouped under the name "****FUNDAMENTAL CODE****" together with the* ***Inductive Principles****, represent the central part of the* ***Unified Theory****.*