

Kurpishev FOS, the Desargues-Kurpishev Theorem, Harmony of Truth and the Extended PN.2

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Abstract

This journal article assembles four mathematical nodes of the project *Kurpishev Logic 2* into one systematic line: Fundamental Support Connectivity (FOS), the Desargues-Kurpishev Theo-

rem, the harmony of truth in the resolution of aporias, and the extended Kurpishev uncertainty principle PN.2. The central task is to replace separate declarations by a verifiable construction: an event@state receives a Reper closure, a Reper receives the fourth harmonic point of sufficient foundation, and a world appears as a reduction of FOS. The main formula is

$$\text{FOS} = \lim_{\leftarrow \tau \in \mathcal{J}} \prod_{c \in \text{Ob}(\mathcal{C}_\tau)} (R_c, I_c, U_c; D_c).$$

FOS is not understood as “everything whatsoever”, but as the condition of Reper-realizability of every possible world. The article contains definitions, axioms, theorems, a proof protocol, reduction tables, and links to projective geometry, Kantian intuition, Bourbaki’s structural programme, Kline’s crisis of certainty, and the PILOT-01 formula-chain audit.

Keywords: Kurpishev FOS; Reper; RBD; KLT; Desargues-Kurpishev Theorem; PN.2; Time@Space; projective harmony; aporias; Kant; Plato; fundamental theorem of algebra; packet logic.

1. Problem statement

In Monograph 5.0 the minimal object of the project is an event@state:

$$c = C@C = (e, s).$$

This differs from a classical point. A point is already a result of reduction, whereas an event@state preserves the act of occurrence and the layer of state. The same corpus fixes the Reper quadruple

$$\text{Rep}_i = (R_i, I_i, U_i; D_i),$$

and the truth closure

$$\text{Truth}(\text{Rep}) \iff \text{cr}(U, I; R, D) = -1.$$

The truth defect is

$$\lambda = \frac{(U - R)(I - D)}{(U - D)(I - R)}, \quad \delta_{\text{truth}} = |\lambda + 1|.$$

The task of the present article is to pass from local formulas to a general mathematical construction. FOS must explain why the same skeleton works for logic, geometry, physics, finance, chemistry, DNA, culture and art.

2. Source framework and prior art

The method separates the classical background from the author’s contribution. The background includes projective geometry, cross-ratio, affine and metric reductions, the complex plane, tensor geometry, Kant’s theory of intuition and the debate on the foundations of mathematics. The author’s contribution is to assemble these layers into a packet-Reper construction with explicit sufficient foundation.

Bourbaki supplies the structural framework: mathematical unity is searched for in architecture of structures, not in a mere sum of disciplines. Ponarin is used for the distinction between affine, projective and metric reductions. Arnold supports the geometric treatment of complex numbers. Rashevsky fixes the tensor-Riemannian layer. Bibler and Kantian sources are used for aporias and matrices of understanding. Kline marks the crisis of final certainty in mathematics. PILOT-01 supplies the proof discipline: a harmonic condition does not automatically yield truth-status without domain and foundation.

Layer	Classical source	Function in this article
Structures	Bourbaki	FOS as architecture of reductions
Projectivity	Ponarin	affine/projective/metric distinction
Complexity	Arnold	geometric reduction of the complex plane
Metric layer	Rashevsky	tensor and Riemannian size
Kantian intuition	Oizerman-Narsky, Bibler	present as an observational cut
Foundations	Kline	need for domain and sufficient foundation
RPD audit	PILOT-01	no truth-status without domain and foundation

3. FOS as a Reper limit

Definition 3.1. An event@state is a pair

$$c = C@C = (e, s),$$

where e is an event act and s is a state layer.

Definition 3.2. The Reper of c is

$$\text{Rep}(c) = (R_c, I_c, U_c; D_c),$$

where R_c is established real content, I_c is meaning, name or invariant, U_c is a field of possibilities, and D_c is sufficient foundation.

Definition 3.3. Kurpishev Fundamental Support Connectivity is the inverse limit of all Reper-admissible event@states along the layers of packet time:

$$\text{FOS} = \lim_{\leftarrow \tau \in \mathcal{T}} \prod_{c \in \text{Ob}(\mathcal{C}_\tau)} (R_c, I_c, U_c; D_c).$$

FOS is not a set of all things. It is the condition of Reper-realizability of possible worlds.

4. Seven Size@Dimensionalities in Time@Space

Four local space-like Size@Dimensionalities are fixed:

$$R@R_{loc} = \{\text{point, line, plane, cavity}\}.$$

Three non-local Size@Dimensionalities are

$$R@R_{nonloc} = \{\text{Apeiron/FOS}, \text{Hyparxis}, iH\}.$$

Apeiron/FOS gives the fundamental support connectivity. Hyparxis gives the transitional complex Size@Dimensionality of degree minus one. The observer layer iH carries controlled memory worlds and the layer of immediate external intuition.

5. The present as a complex cut of FOS

The present is not the whole of FOS. It is a cut:

$$N_\omega = \sigma_\omega(\text{FOS}), \quad \omega = (\text{where}, \text{when}, iH, D).$$

Thus the present is determined by where, when, by whom, and under what sufficient foundation the cut is made. Kantian intuition becomes an operator of selecting a local slice.

6. Reduction of worlds

Definition 6.1. A world W is a reduction of FOS if there are an admissible functor Θ_W and a sufficient foundation D_W such that

$$W = \Theta_W(\text{FOS}; D_W).$$

Examples include

$$W_{fin} = \Theta_{fin}(\text{FOS}; D_{market}),$$

$$W_{chem} = \Theta_{chem}(\text{FOS}; D_{reaction}),$$

$$W_{DNA} = \Theta_{DNA}(\text{FOS}; D_{code}).$$

In the financial reduction,

$$\Theta_{fin}(C@C) = (\text{cost}, \text{price}) = (PIX, PEAKS).$$

A commodity is a realized financial event@state:

$$Good = C@C_{fin} = (\text{product}, \text{price state}).$$

7. Central FOS theorem

Theorem 7.1. Let FOS be Fundamental Support Connectivity, Θ_W an admissible reduction functor, and D_W a sufficient foundation of a world W . Then

$$W = \Theta_W(\text{FOS}; D_W)$$

is a Reper-realized world if and only if for every realized object $c \in W$ there exists

$$\text{Rep}_W(c) = (R_c, I_c, U_c; D_c)$$

and

$$\text{Dom}_W(c) \wedge D_c \wedge \text{cr}(U_c, I_c; R_c, D_c) = -1.$$

The proof is by necessity of local fixation, Reper closure, admissible domain and sufficient foundation; conversely these data transform the reduction into a compatible system of Reper assemblies.

8. The Desargues-Kurpishev Theorem

Let Q_1, Q_2 be two non-degenerate conics and p a support line. The centers are poles of p :

$$O_i = [Q_i^{-1}l_p].$$

The central axis is

$$l_O = O_1O_2.$$

For $A, B, C \in p$ the fourth point is

$$D = H_{A,C}(B), \quad \text{cr}(A, C; B, D) = -1.$$

The matrix compatibility condition is

$$\det(Q_1^{-1}l_p, Q_2^{-1}l_p, H_{A,C}(B)) = 0.$$

Theorem 8.1. In an admissible projective-Reper configuration of two conics, a support line and a triple A, B, C , there is a unique fourth harmonic point D which closes the incomplete flag into a Reper quadruple. In the logical reduction every correct inference has a complex projective-harmonic structure.

Law	Packet function	Reper role
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9. Harmony of truth and four laws of logic

Law	Packet function	Reper role
Non-contradiction	choice of one state of an event	R
Excluded middle	conjugation with negative complement	U
Identity	preservation of event invariant	I
Sufficient foundation	closure of cause, domain and support	D

Three laws give a flag. The fourth law gives a Reper.

10. Aporias: Achilles, the tortoise, Kant and Plato

Achilles moves on a metric scale, while the tortoise is held by an affine connection:

$$A(t) \in W_{met}, \quad T(u) \in W_{aff}.$$

Reaching requires a metrizing morphism

$$\mu : W_{aff} \rightarrow W_{met}$$

with domain and sufficient foundation. Without D_μ the aporia is a gap of reduction.

Kant is modeled as a central-affine theory with an improper point and an improper line:

$$K = (P_\infty, L_\infty).$$

Plato is modeled as a central-projective theory with one absolute center:

$$P = (\Omega).$$

There is no regular invertible morphism $K \rightarrow P$ preserving the two Kantian limiting elements and collapsing them into one Platonic absolute without loss of foundation.

11. Extended Kurpishev uncertainty principle PN.2

PN.2-A. There is no global measurement assembling size and dimensionality of every $X \in \text{FOS}$ without choosing D_X :

$$\neg \exists \mathcal{M}_{global} : \mathcal{M}_{global}(X) = (\text{size}(X), \text{dim}(X)).$$

PN.2-B. A triple does not yield a Reper:

$$(R, I, U) \not\Rightarrow \text{Rep}, \quad (R, I, U; D) \Rightarrow \text{Rep}.$$

PN.2-C. In general, repairing a quantum hole changes the foundation:

$$Gap(X) \wedge Repair(X) \Rightarrow D'_X \neq D_X.$$

12. Quantum scale@perspective and stitching holes

A hole is absence of an admissible transition:

$$Hole(c) = \neg \exists D_c : \text{Dom}(c) \wedge \text{cr}(U_c, I_c; R_c, D_c) = -1.$$

The stitching operator is

$$\mathcal{S}_{\hbar, A} : \text{Gap}(c) \rightarrow \text{Rep}(c'), \quad A = A^*.$$

Quantum tunnelling is a transfer through a missing classical domain under a new sufficient foundation. A quantum dot is a localized Reper-cut with a controlled field of possibilities.

13. The fundamental theorem of algebra as a FOS reduction

The classical theorem states that every non-constant complex polynomial has a root in \mathbb{C} :

$$P(z) = a_n z^n + \dots + a_0.$$

In packet form:

$$P_{FOS}(X) = A_n \odot X^{\odot n} \oplus \dots \oplus A_0.$$

The root is not merely a field element but a Reper-realized event@state X_0 :

$$P_{FOS}(X_0) = 0,$$

$$\text{Rep}(X_0) = (R_{X_0}, I_{X_0}, U_{X_0}; D_{X_0}),$$

$$\text{cr}(U_{X_0}, I_{X_0}; R_{X_0}, D_{X_0}) = -1.$$

The classical theorem is recovered by the reduction

$$\mathbb{C} = \Theta_{\mathbb{C}}(\text{FOS}; D_{\mathbb{C}}).$$

World	Event	State	Reper foundation
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14. Applied reductions

World	Event	State	Reper foundation
DNA	codon/mutation	expression	D_{code}
Chemistry	reaction	concentration/phase	$D_{reaction}$
Biosystem	regulation act	homeostasis	D_{life}
Finance	product/transaction	price	D_{market}
Culture	form	perception	$D_{context}$
Art	image	composition state	D_{form}

15. Proof protocol

Status	Meaning
Classical known fact	accepted classical background
Author definition	definition introduced in KLT/FOS
Internal theorem	theorem inside KLT/RBD/FOS
Conditional theorem	theorem under an explicit domain
Open candidate	theorem candidate requiring proof-chain
Gap	domain or foundation gap

16. Conclusion

FOS is constructed as the inverse limit of Reper-assemblies of event@states. The Desargues-Kurpishev Theorem supplies the geometry of the fourth harmonic point. Harmony of truth diagnoses aporias as mixed reductions. The extended PN.2 fixes the impossibility of assembling size and dimensionality, Reper and flag, hole and repair without sufficient foundation. The classical fundamental theorem of algebra becomes a reduction of a more general FOS theorem of Reper-realizability of the root.

$$\text{Truth}_W(c) \iff \text{Dom}_W(c) \wedge D_c \wedge \text{cr}(U_c, I_c; R_c, D_c) = -1.$$

FOS is not “everything”. FOS is the condition that any possible world can be built as a world rather than as a random aggregate of unrelated fragments.

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