

Canonical source: Russian KLT-M2-SYL-v1.0. Delivery edition v1.1 adds complete working EN/ZH translations. Mathematical claims and scientific statuses are unchanged. Independent translation review has not been performed. Statements about source reading describe the original release.

Syllogistics in 2D/3D within the KLT-RBD method

Ivan Borisovich Kurpishev. The project “KURPISHEV LOGIC 2”. Supplement KLT-M2-SYL-v1.0 / ARBD48 to the published RUN-035. 17 September 2026.

Abstract

The method incorporates four classical moods of the first figure, an exact algorithm for logical consequence, explicit countermodels and witnesses, checks of term compatibility, and a common transport of set relations. Eight 2D/3D diagrams and two Desargues–Kurpishev drawings are inherited from KLT-SYL-DK v1.1 without byte changes. Conditional error-propagation bounds under a common measure and an admissibility criterion for compression over a fixed predicate vocabulary are added.

The research formulation, method and project are due to I. B. Kurpishev. The syllogistic rules, properties of set images and invariance of the cross-ratio are classical facts. Their new software integration is not presented as a proof of the universal truth of texts or as a physical theory.

Three independent levels

The first level is the validity of an implication under explicitly specified semantics. The second is admissibility of geometric or computational transport. The third is justification of the premises themselves and applicability to the observable world. Passing the first two levels does not certify the third.

Scientific statuses: SCIENCE=ABSTAIN; truth_layer_promotion=0; real_forecast_trial=NOT_RUN; EXT_RUN=NOT_RUN. The general obligations DK-PO-1 and DK-PO-2 remain open. Earlier volumes and mathematical modules are not edited.

Source basis

The principal new source is the published article “Categorical syllogisms in 2D and 3D”, KLT-SYL-DK v1.1 / HOSTING r1 [1]. The public archive [2] contains the original diagrams, verification code and an extract from Chapter 19 of Volume I. The attached historical archive of the Desargues–Kurpishev theorem is byte-identical to the copy inside [2]. The whole of Volume I was not reread for this work; its limitations are inherited through that extract and the article.

The original HTML page returned HTTP 200 when read on 17 September 2026. The label LIVE_CHANGED=FALSE in its historical record refers to the initial build and does not override the actual availability of the published page.

1. A common domain and completeness of the finite check

Let X be the domain of discourse, and let S , M and P be three subsets with fixed term meanings. Judgments are specified by the following conditions:

$$\begin{aligned} A(S, P) : S \subseteq P, \quad E(S, P) : S \cap P = \emptyset, \\ I(S, P) : S \cap P \neq \emptyset, \quad O(S, P) : S \setminus P \neq \emptyset. \end{aligned}$$

“Some” means existence, not “some but not all”. Universal judgments do not require S to be nonempty. Nonemptiness of X itself is specified by a separate flag. The middle term must have the same meaning in both premises; identical spelling is insufficient.

Proposition 1. Completeness of the eight-atom model

For any finite system of A/E/I/O judgments over exactly these three unary predicates, satisfiability and consequence depend only on which of the eight membership atoms are nonempty. If a countermodel exists, one exists with at most eight objects. Equality predicates, relations between objects, cardinalities and probabilities are outside this statement.

$$X_{abc} = S^a \cap M^b \cap P^c, \quad a, b, c \in \{0, 1\}, \quad A^1 = A, \quad A^0 = X \setminus A.$$

Proof. The atoms partition X . Each universal judgment prohibits certain atoms; each particular judgment requires a union of certain atoms to be nonempty. Replacing every nonempty atom by one representative preserves all these conditions. Conversely, every chosen collection of nonempty atoms is realized by such representatives. Exhaustive enumeration of 256 supports, or 255 when X is nonempty, is therefore exact. The theorem covers all domains, including infinite ones; a finite regression enumeration does not replace its proof.

Conditional inference and an empty model class

When no compatible models exist, classical semantics makes the implication vacuously true. The applied KLT contract intentionally returns `ABSTAIN_INCONSISTENT_PREMISES`: inconsistent data do not yield a useful prediction. For a nonempty model class, consequence, refutation of the conclusion and indeterminacy are distinguished. An atom representative is a formal model object, not automatically an observed object.

2. Preservation of relations and admissible compression

Theorem 2. Common injective transport [1]

Let $f:X \rightarrow Y$ be injective. Images are considered in $f(X)$, and complements are relative to this domain. Then:

$$\begin{aligned} f(A \cap B) &= f(A) \cap f(B), & f(A \setminus B) &= f(A) \setminus f(B), \\ A \subseteq B &\iff f(A) \subseteq f(B), & A \neq \emptyset &\iff f(A) \neq \emptyset. \end{aligned}$$

Proof. For the reverse inclusion in the intersection identity, $f(a)=f(b)$ implies $a=b$. For differences, $f(a)$ is outside $f(B)$ if and only if a is outside B . The remaining statements follow directly. Thus A/E/I/O forms are preserved and reflected. The same map is applied to all classes and witnesses.

Proposition 3. A criterion for a fixed vocabulary

For an arbitrary map f , consider the membership signature of an object in S , M and P . These three predicates can be uniquely recovered from $f(x)$ if and only if all objects in every fibre of f have the same signature. In this case the direct image defines an isomorphism between the Boolean algebra generated by $S/M/P$ and the algebra of their images in $f(X)$, and preserves the A/E/I/O forms.

$$f(x) = f(y) \implies (1_S(x), 1_M(x), 1_P(x)) = (1_S(y), 1_M(y), 1_P(y)).$$

Proof. The condition is necessary for the three predicates to be well-defined on the image. Under this condition all three sets and their generated algebra are saturated by fibres of f . Their images preserve intersections and complements, and inverse image recovers every original set. This gives an isomorphism preserving nonemptiness. Different objects of one atom may therefore be identified, but different signatures may not be identified.

The condition is necessary for recovery of membership and sufficient for all four forms. It is not claimed to be necessary for accidental agreement of the truth values of individual A/E/I/O judgments. Properties outside the fixed vocabulary, set cardinalities and measures are not covered by this certificate. Aggregating probabilistic data also requires preservation of weights: the pushforward measure must be specified separately.

3. The plane, space and the harmonic configuration

A common 2D map

$$h(x, y) = \left(\frac{x}{1 + x/8}, \frac{y}{1 + x/8} \right), \quad x \neq -8.$$

The projectivity matrix has determinant 1. The atlas regions lie entirely in the chart with positive denominator. For a new region, absence of a pole must be checked throughout the region, not just at its centre. The transport button checks only the entered point. The inverse map in finite coordinates has the opposite denominator coefficient.

A 3D lift

$$L(x, y, t) = (tx, ty, 4t), \quad T = [1, 2], \quad \widehat{A} = L(A \times T).$$

The map is injective on $X \times T$: $t=z/4$, $x=X/t$ and $y=Y/t$. For nonempty T , the operation $A \mapsto A \times T$ preserves Boolean relations and nonemptiness; the subsequent L preserves them by Theorem 2. Thus the conical layers reproduce the class regions and witnesses. Adding the common apex $t=0$ can make disjoint nonempty classes intersect there. Projection of a spatial scene onto a screen is likewise not a proof of spatial intersection.

Two distinct geometric checks

In the explicit example [1,2], the construction $H=I_3+\alpha v\ell^T$ fixes the line ℓ and gives perspective triangles with this axis. The line ℓ is an input to the construction. Agreement of axes in this example does not prove their canonical recovery from arbitrary pairs of conics. The harmonic condition is checked independently, following Chapter 19 of Volume I [3].

$$\lambda = \text{cr}(U, I; R, D_g) = \frac{(R - U)(D_g - I)}{(R - I)(D_g - U)}.$$

$$\text{cr}(-1, 1; 1/3, 3) = -1, \quad \text{cr}(0, 1; 2, 3) = 4/3.$$

A common projectivity preserves the cross-ratio and the absolute value of its deviation from -1 . Neither a change of viewpoint nor invertibility of the map reverses the logical implication or improves its evidential basis. D_g is a geometric point; D_{evidence} is a source or proof. They have different types.

4. Quantitative bounds for inexact premises

Let (X, Σ, μ) be one probability space, with S, M, P measurable. All masses below use the same normalization by μ . Conditional proportions with different denominators cannot be substituted without an additional conversion. These bounds are not formulas for the λ -defect.

Theorem 4. Upper bounds for universal conclusions

$$\begin{aligned}\mu(S \setminus P) &\leq \min\{1, \mu(S \setminus M) + \mu(M \setminus P)\}, \\ \mu(S \cap P) &\leq \min\{1, \mu(S \setminus M) + \mu(M \cap P)\}.\end{aligned}$$

Proof. For Barbara, each object of S outside P either lies outside M or belongs to M outside P . For Celarent, each object of S inside P either lies outside M or belongs to M inside P . Monotonicity and subadditivity of the measure give both bounds; total mass is at most 1.

Theorem 5. Lower bounds on witness mass

$$\begin{aligned}\mu(S \cap P) &\geq [\mu(S \cap M) - \mu(M \setminus P)]_+, \\ \mu(S \setminus P) &\geq [\mu(S \cap M) - \mu(M \cap P)]_+.\end{aligned}$$

Proof. Partition $S \cap M$ into its parts inside and outside P . In the first case the removed part is bounded by $\mu(M \setminus P)$, and in the second by $\mu(M \cap P)$. Subtraction and nonnegativity give the result. Here $[u]_+ = \max(0, u)$. A strictly positive lower bound suffices for existence; a zero bound neither proves absence nor guarantees presence. A nonempty set may have measure zero.

If only an upper error bound ε for the major premise and a lower mass bound w for the minor premise are known, $[w - \varepsilon]_+$ is a valid guarantee. For universal premises the upper errors add. With $S = \{1, 2\}$, $M = \{2\}$, $P = \emptyset$ and equal weights, the premise errors are each $1/2$ while the conclusion error is 1. Hence the maximum of the errors is not a general bound; their sum is sharp here. These elementary estimates follow from set inclusions, not from a new probabilistic interpretation of the author's λ -truth.

5. A typed map of the method and prediction

An operational map of roles

U_{sem} stores the domain, context, time and modality of judgments. I_{sem} stores definitions and versions of the meanings of S/M/P. R_{sem} stores quantifier forms, inference direction and the transport rule. $D_{evidence}$ stores premise-source locators, their statuses and the proof of the rule. This is an operational map for the KLT-RBD interface, not a replacement of the canonical definitions in the volumes.

The manuscript annotations “I and U are premises” and “I,U are cones” are retained as the author’s roles in the particular diagram. Their full identification with the canonical components and layers of RPLD remains OPEN_AUTHOR_ROLE_IDENTIFICATION. Neither screen planes nor the four numbers of a harmonic quadruple are assigned to semantic components without a separate encoding map.

$$\text{Source} \longrightarrow (U_{sem}, I_{sem}, R_{sem}, D_{evidence}) \longrightarrow \text{AEIO} \longrightarrow \text{Proof}.$$

Geometric encoding is an additional typed object: map domain, version identifier, common transport, ordered quadruple and reasons for its selection. It does not replace the fields in the preceding chain. A bibliographic reference to the method does not certify arbitrary user premises.

Connection to prediction of events and states

A syllogistic consequence can restrict the admissible scenario set only when the predicate interpretation and common domain are already justified. Passing to a later time requires a separate dynamical rule. Reusing predicate letters at different times does not establish such a rule; the current contract blocks mismatched contexts.

$$\Gamma = \{\omega : \omega \models \mathcal{P}\}, \quad V_q = \{1_q(\omega) : \omega \in \Gamma\}.$$

For nonempty Γ , the value sets $\{1\}$, $\{0\}$ and $\{0,1\}$ mean conditional consequence, refutation and indeterminacy, respectively. For empty Γ , the result is ABSTAIN. This is a logical value set without probability weights: the fraction of supporting masks is not the probability of the conclusion. RUN-035 retains its separate contract for temporal availability, measurements and dynamics. This release does not implement automatic transfer of a card into empirical forecasting.

The software prohibition on deriving physical status from harmonicity alone agrees with the D/Dom barrier in PILOT-01, Theorem 4.1 [4]. Its text was read directly in the attached PDF.

6. Executable contract and verification

The syllogisms.js module runs autonomously in a browser and in Node.js. KLT-SYL-CONTRACT-v1 fixes the domain, term meanings, between 1 and 16 premises, and a conclusion. Only three named unary predicates and A/E/I/O forms are supported. Unknown fields and attempts to promote scientific status are rejected.

The interface offers four correct moods and two invalid examples. Changing quantifiers recalculates the result. Adding existence of S explicitly adds a premise. JSON import revalidates the contract and recomputes the result; the old result field is not accepted as proof. This module does not automatically analyze user texts.

Rational operations are exact and use arbitrary-precision integers. The interface accepts integers and fractions such as $1/8$; decimal approximations are not declared exact. At a pole of the 2D map or an inadmissible 3D layer, calculation stops. The compression certificate applies only to the explicitly supplied objects and three predicates.

Verification scope

The 29 new automated tests cover the four moods, invalid orientations, absence of existential import, changes of context and middle-term meaning, incompatible premises, exact geometric operations, and preservation of scientific statuses.

All 64 combinations of three quantifier forms in the first figure were compared with a separate set evaluation on 255 nonempty atom supports. In addition, 4096 triples of subsets of a four-element domain were considered: each was checked against the four moods and four inequalities with common weights 1,2,3,4. Geometric invariants were compared with the unchanged RUN-035 module. These regressions were developed in the same work process and are not an independent EXT_RUN.

Checks of the publication interface and final build are recorded separately in the checkpoint. The static atlas illustrates the named classical mood; after premise changes the interface explicitly warns that the drawing does not represent the new formula set.

Next stage

Agree with the author on the full map of manuscript roles and RPLD layers; add manual source locators for real premises and separate verification of their grounds; then design a typed adapter to the dynamics contract. The planned RUN-036 on uncertain reference points and shared calibration remains pending. This supplement neither replaces it nor declares it completed.

7. Bibliography and source limitations

[1] Kurpishev, I. B. Categorical syllogisms in 2D and 3D. KLT-SYL-DK v1.1 / HOSTING r1, 17 September 2026. Principal source of the diagrams and project formulation; the complete published page was read.

https://kurpishev.com/ru/syllogisms-2d-3d_ru.html

[2] Kurpishev, I. B. KLT-SYL-DK v1.1 PUBLIC r1. Public archive: SVG diagrams, registers, verification code, sources and an extract from Volume I. Obtained through the download page linked from [1].

https://kurpishev.com/ru/syllogisms-downloads_ru.html

[3] Kurpishev, I. B. Basic Project KLT-RBD. Volume I v197 RU, Chapter 19, original pp. 78–81 / PDF pp. 83–86. This supplement directly used source/tom1_ch19_excerpt.txt in [2], including Theorems 19.1–19.5 and DK-CERT; the full PDF was not rechecked. The historical standalone `desargues_kurpishev_theorem_ru_source.zip` of 5 May 2026 is subordinate to the later limitations in [3].

[4] Kurpishev, I. B. Reference-projective architecture of formula chains: PILOT-01. 3 May 2026, §4, Theorem 4.1. Attached `PILOT01_PREPRINT_RU_FINAL.pdf`; the D/Dom barrier rule was directly checked. It specifies an audit of missing grounds and domain, not empirical confirmation of the method.

[5] Aristotle. Prior Analytics, Book I, Chapter 4. Translation by A. J. Jenkinson. Classical primary source for the four syllogistic schemes. Read on 17 September 2026; the mathematical semantics of empty classes in this supplement is specified separately.

<https://logoslibrary.org/aristotle/prior/104.html>

[6] Kurpishev, I. B. Projective dynamics and sufficiency of reference points. RUN-035 / ARBD47, 16 September 2026. Inherited restricted dynamics class, exact coordinates and rules for transporting uncertainty intervals.

<https://klt-rbdv6-analyzer.workspace-406992.chatgpt.site/arbd/dynamics-mathematics.html>

Checksums and links for the files directly used are in `source-registry.json`. The source-check count for KLT-SYL-DK v1.1 quoted in the article concerns the earlier build and is not added to the new ARBD48 test count. Chemistry materials, APK files, the Kant corpus and other attached archives were not required for this mathematical supplement and are not claimed to have been read.