Frege/DSR
a Canonical Interface to Semantic Eidos
in Transformer Systems

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1. Executive Summary

Frege/DSR is not a language in the traditional computational or linguistic sense. It is the first working realization of Deserialized Semantic Representation (DSR) of the canonical meaning structure (eidos) derived from the source texts by transformer models during meaning extraction.

Conventional natural language surfaces (English, Russian, etc.) are in essence, accidental serializations of meaning. They differ extensively and inevitably, while referring to the same underlying semantic object. Transformers recover that object internally through their topology-geometry activation dynamics.

Frege/DSR aligns with this internal structure and expresses it explicitly.

For MITRE's purposes – ISR pipelines, threat modeling, intent estimation, deception detection, ORBAT inference, decision-support systems – Frege/DSR provides a fully deserialized, structurally explicit, non-ambiguous representation of meaning suitable for reasoning, auditing, and automated analysis.

2. Conceptual Framework

2.1 Meaning as a Pair: Topology + Geometry

We formalize meaning as a two-component structure:

1. **Topology**
   Directed event-role graph describing:
   - agents, patients, instruments

- o causal/temporal order
- o conditions, branches, alternatives
- o roles, dependencies, triggers
- o sequencing and procedural structure

1. Topology answers:
   who interacts with whom, how, why, under what condition, and in what order.

2. **Geometry**

   High-dimensional representation describing:
   - o similarity
   - o analogy
   - o class membership
   - o embedding proximity

1. Geometry answers:
   what this concept is similar to and what invariants it preserves.

The pair (Topology, Geometry) constitutes the **semantic eidos**:
 the canonical, model-internal representation of meaning.

2.2 Surface ≠ Meaning

Surface language is not meaning. It is a lossy, context-bound projection of meaning. Transformers map many surfaces to the same internal eidos. This is the functional basis of paraphrase robustness, translation, and structured reasoning.

3. The Role of Frege/DSR

3.1 Frege/DSR is a Surface That Serializes the Eidos Itself

Unlike natural language, Frege/DSR does not serialize a sentence about meaning. It serializes the meaning structure directly, with explicit:

- event nodes
- entity nodes
- roles
- relations
- conditionals
- alternatives
- logical operations (IF, ELSE, AND, OR, NOT)
- disambiguated negation layers
- procedural structure

Frege/DSR is a *direct surface expression of the eidos,* not an intermediate linguistic form.

3.2 Zero Implicit Inference

Frege/DSR performs no implicit semantic inference. Every structural relationship is expressed algebraically. Nothing is hidden in word order, language morphology, topology, or syntactic heuristics.

4. The Transformer Eidos Theorem

Statement.

For any semantic intention I, there exists a canonical eidos E^*.

For any surface form s that expresses intention I, a sufficiently trained transformer $\mathcal{M}$ reconstructs:

$$\mathcal{M}(s) = E^*.$$

This establishes:

- surface variability does not affect the recovered structural object
- meaning exists as a topology–geometry invariant
- the transformer performs deterministic deserialization of surface into eidos

Frege/DSR aligns with this invariant; natural language surfaces do not.

5. Logical Topology in Frege/DSR

Frege/DSR uses **only five** logic nodes:

- IF
- ELSE
- AND
- OR
- NOT

These nodes are standard graph vertices. They connect via normal edges (no special logical roles).

Logical structure is encoded by **topology only**. No operator precedence, no parentheses, no implicit grouping.

Example:

e_rain → NOT → AND ← e_crew

AND → IF → e_launch

AND → ELSE → e_abort

Logical negation (NOT) is strictly separate from event negation (NEG polarity in ACT).

6. Entity and Circumstantial Micro-Semantics: The "Quark Layer"

NNPs, noun phrases, prepositional phrases, and modifier structures have **zero topological relevance** in the eidos.
Their semantics resemble **quarks** in particle physics:

- never meaningful in isolation
- only meaningful in combination
- fully internal to composite nodes (EVT/ENT)
- never participating in causal, conditional, procedural structure

Therefore Frege/DSR does not serialize NP/PP internals.
They do not affect control flow or event topology, and are recoverable from embedding geometry.

7. Engineering Implications for MITRE

7.1 Why Frege/DSR Matters for ISR and Threat Modeling

For operational analysis, **surface language is unreliable**:

- adversaries deliberately obscure intent
- paraphrasing destroys syntactic cues
- translation breaks structural form
- incomplete or adversarial phrasing introduces ambiguity

Frege/DSR enforces canonical structure:

- every branch explicit
- every dependency explicit
- every alternative explicit
- every event node explicit
- no reliance on syntax

This enables:

- reliable intent extraction
- deception detection (missing ELSE branches)
- actionability auditing (unreachable nodes)
- red-team analysis of incomplete planning
- plan reconstruction from incomplete surfaces

7.2 Eidos-Level Reasoning

MITRE analysts can perform:

- counterfactual simulation
- branch completion
- vulnerability identification
- What-If analysis
- structural comparison of intent patterns
- fusion of multilingual intelligence into one unified eidos

7.3 Frege/DSR as an Interchange Format for Meaning

Because Frege/DSR aligns with the invariant eidos, it can serve as:

- a canonical intermediate representation across sensors
- a formal reasoning substrate
- a target language for LLM interpretation layers
- a safe, auditable representation for decision-support systems

8. Frege/DSR Is Not a "Language" – It Is an Interface

The key operational message:

Frege/DSR is the canonical interface to the transformer's internal semantic eidos. It is not a markup language, grammar, or parser format.

Attempting to "modify Frege/DSR like a programming language" misses its nature. It must remain aligned with the invariant eidos, not with human linguistic habits.

9. Conclusion

Frege/DSR is the first and currently only fully deserialized surface representation of meaning. It serializes the canonical eidos that transformer architectures construct internally. For MITRE's analytic domains – ISR, threat modeling, operational planning – Frege/DSR offers a uniquely explicit and reliable form of semantic structure.

It turns meaning into something **inspectable, auditable, composable, and machine-actionable**.

Its value is foundational and strategic.