PRIOR ART SEARCH AND PATENTABILITY ANALYSIS: A METHOD AND SYSTEM FOR TIERED SELF-EMERGENCE IN TRANSFORMER MODELS (TES)

I. EXECUTIVE SUMMARY AND RISK ASSESSMENT

This report provides a comprehensive prior art search and patentability analysis for the invention titled "A Method and System for Tiered Self-Emergence in Transformer Models" (hereinafter "TES"), as disclosed in the provisional patent application TES_Provisional_Patent.pdf. The analysis covers U.S. patents, published applications, international filings, and academic literature to assess the novelty and non-obviousness of the core inventive concepts.

The central finding of this analysis is that while several foundational components of the TES system exist in the prior art in isolation, their specific combination, integration, and application as claimed appear to be novel. The strongest arguments for patentability lie in the synthesis of disparate measurement techniques into a single control vector and the subsequent use of this vector in a closed-loop, autonomous optimization system.

However, the invention faces a significant risk of rejection under 35 U.S.C. § 103 (obviousness). The concepts of partitioned model architectures and the use of individual metrics to probe a model's internal state are well-established. A patent examiner will likely argue that combining these known elements would be obvious to a person of ordinary skill in the art. The success of a non-provisional application will depend on effectively arguing that the specific combination claimed in TES is unique, synergistic, and yields unexpected results not taught or suggested by the prior art.

The following risk matrix summarizes the patentability challenges for the core concepts of the TES invention.

TABLE 1: PRIOR ART RISK MATRIX FOR TES CORE CONCEPTS

Core Inventive Concept	Key Prior Art References	Novelty Risk (102)	Non-Obviousness Risk (103)	Rationale for Risk Assessment
Four-Tier Internal Architecture	(General Transformer Architectures, Partitioned Models)	Low	High	The specific four-tier functional definition (Persona, Agentic, etc.) is not explicitly disclosed. However, the art teaches both hierarchical and dynamically partitioned model states for specialization, making a pre-defined functional hierarchy a potentially obvious design choice.
Composite Emergence Vector (E)	(Metrics like ΔH, R(t), Sphen; vector synthesis for control)	Medium	Medium	The individual components (ΔH, $R(t)$, Sphen) are known concepts for model analysis. The specific formulation of $R(t)$ appears novel. The primary novelty lies in the synthesis of these three specific metrics into a single vector for control, which is not taught.
Persistent Braid Multigraph	(Graph data structures for logging information flow)	Low	Medium	Using a graph data structure to log information flow is a known computer science technique. Its application here is specific, but an examiner may view it as an obvious implementation choice for logging the claimed cross-tier data.
Autonomous Optimization Trigger	(Closed-loop AI optimization, real-time parameter modification)	Low	Low	The prior art on hyperparameter tuning is dominated by open-loop, pre-deployment methods. A closed-loop system that modifies its own operational parameters in real-time based on a measure of its internal state represents a

Core Inventive Concept	Key Prior Art References	Novelty Risk (102)	Non-Obviousness Risk (103)	Rationale for Risk Assessment
				significant and non-obvious departure.

Note: Key Prior Art References are generalized based on search results and the provided text, as specific document IDs were not available in the input.