Unified Socio-Mythic Calculus (USMC) Specification

1 Universe and State

Definition 1 (Nodes, types, qualities, energies)**.** *Let $\Omega = \{N_i\}$ be a finite set of nodes with*

$$N_i = \big(\text{Name}_i,\ T_i,\ Q_i,\ E_i\big),$$

where T_i tags domain (e.g. mythic character/place/idea or social object/config), $Q_i \in \{-1, +1\}$ encodes wound/gift or stress/content polarity, and $E_i \in \mathbb{R}$ encodes magnitude or salience.

Definition 2 (Story/experience graph with suspended set)**.** *At discrete time t, define*

$$G_t = (\Omega, E_t, S_t),$$

where $E_t \subseteq \Omega \times \Omega$ are active bonds *(edges), and $S_t \subseteq \Omega \times \Omega$ are* suspended ties *captured by the* naught *operator $\widehat{(0)}$.Apairmaybeactive, suspended, orabsent.*

2 Primitive Operators

Definition 3 (Pointwise operators on pairs (i, j))**.** *For each ordered pair (i, j), define*

$$\hat{A}_{ij} \in \{\widehat{+},\ \widehat{-},\ \widehat{0}\} :$$

- ***Connect*** $\widehat{+}_{ij}$*: add (i, j) to E_t; remove from S_t.*
- ***Disconnect*** $\widehat{-}_{ij}$*: remove (i, j) from both E_t and S_t.*
- ***Naught*** $\widehat{0}_{ij}$*: move (i, j) to S_t (deliberate non-action that preserves potential).*

3 Composite Transform as Guarded Naught

Definition 4 (Motif and boundary)**.** *Let $M \subseteq G_t$ be a motif (subgraph). Let ∂M denote the set of pairs on the boundary of M relevant for suspension.*

Definition 5 (Guarded transform)**.** *Define the* transform *operator on motif M by*

$$\hat{\tau}_M \ := \ \underbrace{\prod_{(i,j)\in\partial M} \widehat{0}_{ij}}_{\text{create conserved gap}} \ \circ \ \underbrace{\mathsf{Wait}\big[\, g_M(G) \,\big]}_{\text{fire at threshold}} \ \circ \ \underbrace{\mathsf{Rewire}_M}_{\text{relabeled nodes/edges}} \ .$$

Here, the guard function $g_M(G)$ encodes a phase threshold; when satisfied, Rewire_M may add/remove edges and relabel qualities/energies within M.

4 Effects, Value, and Objective

Definition 6 (Pair effect and totals)**.** *For any prospective or active pair (i, j), define pair effect*

$$\Phi_{ij} = (Q_i E_i) + (Q_j E_j).$$

Define total realized effect

$$\Phi_{\text{total}}(G_t) = \sum_{e_{ij} \in E_t} \Phi_{ij}.$$

Definition 7 (Order and Freewill)**.** *Let*

$$O(G_t) = \Phi_{\text{total}}(G_t) - \lambda \cdot \text{Complexity}(G_t), \qquad F(G_t) = \sum_{e_{ij} \notin E_t} |\Phi_{ij}|.$$

Optionally decompose $F = F_{\text{susp}} + F_{\text{abs}}$ with F_{susp} summing pairs in S_t.

Definition 8 (Target objective (singularity))**.** *With weights $\alpha, \beta > 0$, define*

$$G^* = \arg\max_{G_t} \big[\alpha\, O(G_t) + \beta\, F(G_t)\big].$$

5 Threshold Guards

Two families of guards are common; either can be used alone or in concert.

- **Counting/structure guard (mythic):** fire when an event count or structural criterion reaches a narrative threshold $k = T_n$.
- **Value/ratio guard (social):** fire when a criterion indicates readiness or safety, e.g. a tension–content ratio crossing an ε-band, or a prescribed gain condition $\Delta O \geq 0$.

6 Dynamics and Policy

Definition 9 (Step dynamics)**.** *At each step,*

$$G_{t+1} = \hat{A}\, G_t, \qquad \hat{A} \in \{\widehat{+},\ \widehat{-},\ \widehat{0},\ \hat{\tau}\}.$$

A policy selects $\hat{A}$ to ascend the objective $\alpha O + \beta F$, while any use of $\hat{\tau}$ must satisfy its guard.

Definition 10 (Operator statistics)**.** *Track operator rates r_+, r_-, r_0, r_τ and guard triggers to localize phase changes in the process.*

7 Minimal Worked Example

Consider nodes

$$N_h = (\text{Hero}, \text{Char}, +1, E_h), \quad N_s = (\text{Sword}, \text{Artifact}, -1, E_s),$$

and motif $M = \{h, s\}$.

(1) Naught. Apply $\widehat{0}_{hs}$: move pair (h, s) to S_t (tension held, potential conserved).

(2) Guard. After thresholds/ratios satisfy $g_M(G)$, the transform may fire.

(3) Transform. Apply $\hat{\tau}_M$ with relabeling $Q_s : -1 \to +1$ and bond $\widehat{+}_{hs}$. The change in pair effect is

$$\Delta\Phi = \big[(+1 \cdot E_h) + (+1 \cdot E_s)\big] - \big[(+1 \cdot E_h) + (-1 \cdot E_s)\big] = 2E_s.$$

Thus O increases (modulo the complexity term), and F decreases for that pair as potential becomes realized.

8 Assumptions and Notes

- $Q \in \{-1, +1\}$ is a coarse polarity; refinements (e.g. continuous valence or multi-axes qualities) are admissible with minor algebraic changes.
- Complexity(G) penalizes gratuitous structure; any monotone measure (e.g. description length or sparsity loss) can be used.
- Guards can be domain-tuned (ritual time windows, consensus thresholds, safety checks) without altering the operator algebra.

Appendix A: Symbol $\leftrightarrow$ Term Map

Symbol	Interpretation
Ω	Entities (mythic roles, social objects)
E_t	Active bonds / realized ties
S_t	Suspended ties via naught (held potential)
Q_i	Polarity: wound/gift or stress/content
E_i	Salience/strength/charge
$\widehat{+}, \widehat{-}, \widehat{0}$	Connect, Disconnect, Naught
$\hat{\tau}$	Guarded transform (naught $\to$ threshold $\to$ rewire)
Φ_{ij}	Pair effect contribution
O, F	Order (realized, minus complexity) and Freewill (unrealized potential)
$g_M(G)$	Threshold function (counting/structure or value/ratio)
G^*	Target configuration maximizing $\alpha O + \beta F$

Appendix B: Operator Table

Op	**Name**	**Precondition**	**Effect on** (E_t, S_t)
$\widehat{+}_{ij}$	Connect	pair (i,j) exists	$(i,j) : S_t \setminus \{(i,j)\},\ E_t \cup \{(i,j)\}$
$\widehat{-}_{ij}$	Disconnect	pair (i,j) exists	$(i,j) : E_t \setminus \{(i,j)\},\ S_t \setminus \{(i,j)\}$
$\widehat{0}_{ij}$	Naught (Suspend)	pair (i,j) exists	$(i,j) : E_t \setminus \{(i,j)\},\ S_t \cup \{(i,j)\}$
$\hat{\tau}_M$	Transform (Guarded)	$g_M(G)$ true	Rewire edges/labels within M