

## ERES Formula V1.4 (Full Revisions & Final Draft)

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### 1. Revision History & Derivation

- **V1.0** – Core CA<sup>2</sup> kernel:
  - $\Sigma (A_1 \rightarrow B_2)$  “Economic Give & Get”
  - $\prod (C_3 \wedge D_4) / \Omega$  “Ecologic Trust × Policy Weight”
  - $\wedge \Phi(F_7)$  “Adaptive AI Feedback”
  - $\Gamma (1 - R_8) / M_9$  “Collision-Avoidance Penalty”
- **V1.1** – Added:
  - $\Theta \square$  “Political-Will Penalty” in  $\Sigma$ -term
  - $\Xi \Delta W$  “Transparency & Equity Credit” ERES CA<sup>2</sup> Formula V1.1
- **V1.2** – Refined:
  - Embedded KPI calibration
  - Formalized wage-gap credit
  - Case-study addendum removed to avoid misinformation ERES CA<sup>2</sup> Formula V1.2 (...)
- **V1.3** – Extended:
  - $L(x), I(y), S(z), E(m), R(n), D(p)$  “Flexigent Wayfinding Variables”
  - $E_{10}$  “Ethics Coefficient” ERES CA<sup>2</sup> Formula V1.3
- **V1.4** – Final enhancements:
  - **Functional forms** for core transformations
  - **Geometric mean** for Flexigent variables

- **Privacy-preserving** tension index
- **Ethics gating** via min(consent, audit)

## 2. The Version 1.4 Formula

$$X_{\text{UNITY}} = \left( \sum_{i=1}^N \underbrace{\sigma(a_i)}_{E_i} \right) (1 - \Theta_p) + \frac{\prod_{j=1}^M (C_{3,j} D_{4,j})}{\left( \frac{R_{\text{deployed}}}{D_{\text{demand}}} \right)^\beta} + \Lambda \underbrace{\frac{1}{1 + e^{-k(F_7 - \mu)}}}_{\Phi(F_7)} - \Gamma \frac{1 - R_8}{M_9} + \Xi \Delta W + \left( \prod_{k=1}^6 V_k \right)^{\frac{1}{6}} + \underbrace{\min(C_{\text{consent}}, A_{\text{audit}})}_{E_{10}}$$

### 3. Term Definitions & Functional Forms

#### 1. Earned-Path w/ Political-Will Penalty

- $E_i = \sigma(a_i) = 1/(1 + e^{-a_i})$ , where  $a_i$  is the raw “learning → action” score.
- $\Theta_p \in [0, 1]$  penalizes low leadership commitment.

#### 2. Ecologic Trust × Policy Weight

- $T_j = C_{3,j} \times D_{4,j}$  (trust × iteration weight).
- $\Omega_s = (R_{\text{deployed}}/D_{\text{demand}})^\beta, \beta > 0$ .

#### 3. Adaptive AI Feedback

- $\Phi(F_7) = 1/(1 + e^{-k(F_7 - \mu)})$ ;  $k, \mu$  pre-calibrated.
- $\Lambda$  scales intervention strength.

#### 4. Collision-Avoidance Penalty

- $R_8 = \text{Pr}(\text{re-escalation}), M_9 = \text{mitigation reserves}$ .
- Weighted by  $\Gamma > 0$ .

#### 5. Transparency & Equity Credit

- $\Delta W = W_{\text{before}} - W_{\text{after}}$  (wage-gap reduction).
- Weighted by  $\Xi > 0$ .

#### 6. Flexigent Wayfinding Geometric Mean

- $V_1 = L(x), V_2 = I(y), V_3 = S(z), V_4 = E(m),$   
 $V_5 = R(n), V_6 = D(p).$
- Combined as  $(\prod_{k=1}^6 V_k)^{1/6}.$

## 7. Ethics Coefficient

- $C_{\text{consent}}$  = % informed-consent coverage.
- $A_{\text{audit}}$  = bias-audit score in  $[0,1]$ .
- $E_{10} = \min(C_{\text{consent}}, A_{\text{audit}})$ .

## 4. Embedded KPI Targets for 5 / 5 Performance

- $SR \geq 0.90$ ;  $CT \leq 30$  days
- $EI \geq 0.95$ ;  $RTS \geq 85$ ;  $FL \leq 6$  hrs
- $\Omega_s \geq 1.0$ ;  $\Lambda \Phi(F_7) \geq 0.10$ ;  $\Gamma(1 - R_8)/M_9 \leq 0.20$
- $\Xi \Delta W > 0$ ;  $E_{10} \geq 0.80$
- Flexigent: L, I, S, E, R, D each  $\geq 4 / 5$

## 5. Next Steps for V1.5

### 1. Auto-Calibration Engine

- Real-time multi-objective tuning of  $\{\Theta_p, \beta, \Lambda, \Gamma, \Xi, E_{10}\}$ .

### 2. Shock-Scenario Stress-Tester

- Simulated crises injections to validate resilience of  $X_{\text{UNITY}}$ .

### 3. Privacy-First Monitoring

- Federated data pipelines and differential-privacy for  $F_7$  ingestion.

### 4. Community-Driven API

- Decentralized governance endpoints for local parameter adjustments.

## 5. UX & Toolkit Release

- No-code dashboard builder, HFVN voice-flows in local languages, SDK samples.

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**ERES Formula V1.4** delivers a mathematically crisp, ethically gated, and operationally modular engine—optimizing pathways to resilient, participatory, and ecologically balanced cohesion.