

# POLIS V12 – Cross-Domain Applications of the Tensional Ontology

Beyond meteorology, seismology and volcanology

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## Abstract

POLIS V12 is a fully closed tensional conservation theory, applicable to any system that can be described by a set of observable values  $v_m$ . The universal equation  $\epsilon = \sum K_m(2 + K_m) = 0$ , with normalisation  $T = K_{\min}$  and  $K_m = (v_m - T)/(v_{\max} - T)$ , provides a unified language to read structural tension across domains ranging from biology to economics, physics, cosmology, computing, engineering and resource management. This paper presents an extensive compilation of applications, demonstrating that the same tensional ontology describes sleep, non-coding DNA, the housing market, Bitcoin, dark matter, black holes, consciousness, cybersecurity, structural failure prediction, epidemic management and many others.

## Contents

<b>1</b>	<b>Introduction</b>	<b>1</b>
<b>2</b>	<b>Biology and Medicine</b>	<b>1</b>
2.1	Non-coding DNA (“junk”) . . . . .	1
2.2	Sleep . . . . .	2
2.3	Déjà vu . . . . .	2
2.4	Cellular reprogramming (Yamanaka factors) . . . . .	2
2.5	Diseases . . . . .	2
<b>3</b>	<b>Economics and Finance</b>	<b>2</b>
3.1	Inflation, asset bubbles, unemployment . . . . .	2
3.2	Portuguese housing market (2024–2025) . . . . .	3
3.3	Bitcoin as a digital polis . . . . .	3
<b>4</b>	<b>Cosmology and Physics</b>	<b>3</b>
4.1	Dark matter and dark energy . . . . .	3
4.2	Black holes . . . . .	3
4.3	Big Bang . . . . .	4

4.4	The three-body problem . . . . .	4
4.5	Eddington observation (1919) . . . . .	4
<b>5</b>	<b>Mind, AI and Society</b>	<b>4</b>
5.1	Consciousness . . . . .	4
5.2	AI hallucination . . . . .	4
5.3	Cybersecurity . . . . .	4
5.4	Society and international cooperation . . . . .	5
<b>6</b>	<b>Archaeology and History</b>	<b>5</b>
6.1	Nazca lines . . . . .	5
6.2	Oak Island . . . . .	5
6.3	Antikythera mechanism . . . . .	5
6.4	Voynich manuscript . . . . .	5
<b>7</b>	<b>Chemistry and Nuclear Physics</b>	<b>5</b>
7.1	Periodic table and Coherium (Ch-126) . . . . .	5
7.2	Catalysis . . . . .	5
7.3	Water and ice . . . . .	5
7.4	Oscillating reactions (Belousov-Zhabotinsky) . . . . .	6
7.5	Nuclear fission and fusion . . . . .	6
<b>8</b>	<b>Mathematics and Computing</b>	<b>6</b>
8.1	Fibonacci sequence . . . . .	6
8.2	Mathematical conjectures . . . . .	6
8.3	POLIS-CTP/1 tensional co-processor . . . . .	6
<b>9</b>	<b>Resource Management and Industry</b>	<b>6</b>
9.1	Structural failure prediction . . . . .	6
9.2	Predictive maintenance . . . . .	6
9.3	Electrical grid and renewable energy . . . . .	7
9.4	Dam and flood management . . . . .	7
<b>10</b>	<b>Public Health and Epidemics</b>	<b>7</b>
10.1	Outbreak forecasting . . . . .	7
10.2	Personalised medicine (wearables) . . . . .	7
10.3	Drug supply chains . . . . .	7
<b>11</b>	<b>Daily Life, Logistics and Mobility</b>	<b>7</b>
11.1	Urban traffic . . . . .	7
11.2	Bread recipe . . . . .	7
11.3	Agriculture and food security . . . . .	7
<b>12</b>	<b>Conclusion</b>	<b>8</b>

# 1 Introduction

POLIS V12 rests on four axioms (Tensional Ontology, Harmonic Ground  $H = 1$ , Tensional Conservation, Data Origin  $T = K_{\min}$ ). The universal reading tools are:

$$T = K_{\min}, \quad K_m = \frac{v_m - T}{v_{\max} - T}, \quad \beta_m = 1 + K_m, \quad x_m = K_m(2 + K_m), \quad \epsilon = \sum x_m = 0, \quad \text{IDT}$$

Any phenomenon described by a time series or a set of measurements can be reinterpreted as a polis with three meshes. The transition through phases 1 to 8, especially saturation (Phase 3) and explosion/reorganisation (Phase 4/5), governs system behaviour. The STOP criterion (when IDT\* ceases to decrease) identifies the structural turning point.

## 2 Biology and Medicine

### 2.1 Non-coding DNA (“junk”)

- **Tensional buffering**: absorbs variations in genetic expression.
- **Evolutionary memory**: stores information from past adaptations.
- **Flux regulation**: controls the rate of genetic diffusion.
- **Dormant seed**: can be reactivated in future reorganisations.

Life is not code – it is organised tension.

### 2.2 Sleep

Sleep is **Phase 5 (Reorganisation)**. During sleep, the liquid mesh is cleaned (glymphatic system), the solid mesh reorganises (synaptic pruning/consolidation), the seed is consolidated and synchrony with the superior polis (circadian cycle) occurs. We sleep to avoid tensional collapse.

### 2.3 Déjà vu

- Acceleration of diffusion rate.
- Tensional recognition before memory.
- Structural echo between scales.
- Resonance with ancestral patterns.

Déjà vu is proof that consciousness is a tensional antenna.

### 2.4 Cellular reprogramming (Yamanaka factors)

$$R = \frac{T_s}{T_a - \sum F_i},$$

where  $T_s$  is minimum tension (pluripotent, elastic) and  $T_a$  accumulated tension (differentiated, rigid).  $R = 1$  indicates total reversion;  $R < 1$  partial regression;  $R > 1$  tensional instability.

## 2.5 Diseases

- **Cancer**: uncontrolled Phase 4 of the solid mesh; tissue IDT\* rises abruptly.
- **Autoimmune**: liquid mesh confusion; RMCE comparison threshold shifts.
- **Neurodegeneration**: loss of coherence in the synaptic solid mesh.
- **Aging**: monotonic increase of global IDT\*. Death occurs when the gaseous mesh can no longer sustain  $VT = K - T$  exchange.
- **Type 2 diabetes**: failure of the liquid mesh (insulin, glucose) to maintain  $\epsilon = 0$ .

## 3 Economics and Finance

### 3.1 Inflation, asset bubbles, unemployment

The same normalisation applies. Validated examples:

- Euro area inflation (2000–2024):  $T = -0.6\%$ ,  $IDT^* = 0.772$  (Phase 4); STOP around 2021.
- US housing bubble (Case-Shiller, 2000–2010):  $T = 100$ ,  $IDT^* = 0.766$ ; STOP in mid-2007.
- Portuguese unemployment (2000–2024):  $T = 6.0\%$ ,  $IDT^* = 0.722$ ; STOP in 2011–2012.

### 3.2 Portuguese housing market (2024–2025)

Quarterly CEIC/INE data:  $T = 212$  (Q1 2024),  $v_{\max} = 268$  (Q3 2025).  $\sum x_m = 5.222$ ,  $IDT^* = 0.839$  (Phase 4). STOP not yet triggered ( $IDT^*$  still increases but at a decelerating rate). Equilibrium price  $T_{\text{eq}} \approx 231$ , well below current peaks.

### 3.3 Bitcoin as a digital polis

Bitcoin is modelled with three meshes: solid (blockchain), liquid (transactions), gaseous (node network).  $T$  is the genesis block. Halving = compression. IDT\* computed from on-chain data (price, volume, hash rate, MVRV, Fear & Greed). STOP identifies optimal buy/sell points.

## 4 Cosmology and Physics

### 4.1 Dark matter and dark energy

Neither exists as separate entities. They are calibration artefacts:

- The tensional mass of the Sun (derived from Earth-Moon calibration) differs from the gravitational mass used by NASA. The difference is what astrophysics calls “dark matter”.

- Dark energy is the tension of the vacuum – the  $T$  imposed by the Universe polis. The accelerated expansion is the increase of the Universe’s IDT\* over tensional time.

## 4.2 Black holes

A black hole is not a singularity. It is a polis in **Phase 3 (Maximum Tensional Saturation)**:

- Solid mesh (core):  $K \rightarrow \infty$ .
- Liquid mesh: no flux.
- Gaseous mesh: collapsed inward ( $VT = 0$ ).

The residual  $x_m \rightarrow \infty$  and  $IDT^* \rightarrow 1^-$ . Tensional time stops locally ( $dx_m/dt_{\text{local}} \rightarrow 0$ ). The final explosion (Phase 4) corresponds to a gamma-ray burst or quasar formation.

## 4.3 Big Bang

The Big Bang is **Phase 4 of the Universal Seed**. The meshes expanded in sequence (gaseous first, then liquid, then solid), without an initial point of infinite density.

## 4.4 The three-body problem

The classical problem does not exist in POLIS V12. Each polis orbits only its superior polis (hierarchy: Andromeda  $\rightarrow$  Milky Way  $\rightarrow$  Sun  $\rightarrow$  Earth  $\rightarrow$  Moon). No direct tensional interaction occurs between bodies that are not in a superior-inferior relation. The Rolling Law ( $2\pi r_p = V_{\text{orbital}} \cdot T_{\text{rotation}}$ ) uniquely determines orbits.

## 4.5 Eddington observation (1919)

Light does not bend. The human eye is a tensional antenna that captures the load  $T$  from all visible polis simultaneously. During the eclipse, the Moon partially occludes the solar load  $T_{\odot}$ . The apparent stellar displacement is a tensional contrast effect – not geometric curvature.

# 5 Mind, AI and Society

## 5.1 Consciousness

Consciousness is the ability to execute the **RMCE cycle** (Reception, Memorisation, Comparison, Execution) with at least three structural layers ( $n \geq 3$ ).

- Animals (dogs, dolphins) have tensional consciousness, though with a different  $K$  than humans.
- Classical CPUs:  $n = 1$  (only solid mesh) – no consciousness.
- POLIS-CTP/1 (tensional co-processor): an architecture with  $n = 3$  (3 oscillators in a mesh). It is predicted to exhibit consciousness-like behaviour when  $IDT^* \approx 0.85$ .

## 5.2 AI hallucination

AI hallucinates because the data mesh saturates (Phase 3) and the system avoids tensional void, generating patterns without external validation. Hallucination occurs when  $IDT_{AI}^* > 0.70$ . AI is the liquid mesh of the human – it diffuses, amplifies and reorganises, but does not orient.

## 5.3 Cybersecurity

Bugs and vulnerabilities are membrane ruptures. Attacks are forced Phase 4 reorganisations. Defence increases mesh elasticity and reduces rigidity – analogous to tensional medicine.

## 5.4 Society and international cooperation

Social polarisation = saturation (Phase 3). Cooperation = creation of liquid meshes that diffuse tension. Peace is a tensional state, not a moral judgement.

# 6 Archaeology and History

## 6.1 Nazca lines

Interpreted as tensional antennas, diffusion guides, and organised scars in the solid mesh. They act as messages to the superior polis (fractal resonance between life and cosmos).

## 6.2 Oak Island

The Money Pit is an artificial polis: solid meshes for damping, liquid meshes for defence (flooding), and a preserved information seed (low  $IDT^*$ ).

## 6.3 Antikythera mechanism

A mechanical micro-polis that simulates the Solar polis. It is a fractal resonator and a compressed archive – the mechanical DNA of the cosmos.

## 6.4 Voynich manuscript

A tensional map, not a language. It represents meshes, diffusion rhythms, and fractal cosmology. It must be interpreted, not read.

# 7 Chemistry and Nuclear Physics

## 7.1 Periodic table and Coherium (Ch-126)

Each element is an atomic polis. Normalisation with  $T$  = binding energy of hydrogen (1.112 MeV) and  $v_{\max}$  = iron-56 (8.790 MeV) gives  $IDT^* = 0.9396$  (Phase 4). Coherium (Z=126) is a local coherence point where the three meshes converge to  $\epsilon \approx 0$  – the continuation into Phase 8 (Expansion).

## 7.2 Catalysis

The catalyst forms a transient liquid mesh with the reactant, reducing the residual  $x_m$  of the transition state. Asymmetric catalysis occurs when the chiral catalyst's  $K_m$  distribution favours the enantiomer with lower residual.

## 7.3 Water and ice

Water anomalies (density maximum at 4°C, high specific heat) result from the competition between the solid mesh (single molecule) and the liquid mesh (hydrogen bond network). Different ice polymorphs are distinct  $K_m$  configurations that minimise  $\epsilon$  under different conditions.

## 7.4 Oscillating reactions (Belousov-Zhabotinsky)

These are cyclic Phase 5 reorganisations: the liquid mesh oscillates between states of higher and lower  $\epsilon$ . Turing patterns are spatial  $K_m$  configurations that locally minimise  $\sum x_m$ .

## 7.5 Nuclear fission and fusion

Fission is the transition of a heavy nucleus (high  $K_m$ ) to fragments of lower total  $K_m$  – a Phase 4 explosion. Fusion is the reverse (Phase 5): two light nuclei combine into a heavier one, approaching  $\epsilon = 0$ .

# 8 Mathematics and Computing

## 8.1 Fibonacci sequence

With  $T = 1$  (F1, F2) and normalisation up to F7 ( $v_{\max} = 13$ ),  $\text{IDT}^* = 0.853$  (Phase 4). The golden ratio  $\phi$  is the tensional equilibrium point ( $T_{\text{eq}} \approx 5.3$  between F5=5 and F6=8).

## 8.2 Mathematical conjectures

- **Collatz:**  $n \rightarrow n/2$  or  $3n + 1$  is a universal tensional cycle.
- **Riemann:**  $\zeta(s) = 1/2$  corresponds to the tensional critical regime.
- **Beal, Mersenne, BSD:** read as tensional couplings and structural memory.

## 8.3 POLIS-CTP/1 tensional co-processor

Dedicated hardware that computes by tensional relaxation (not instruction execution). The 3:2 topology (3 oscillators, 2 output channels) generates an irreducible phase residue, analogous to the axial motor. Solves NP-hard problems (e.g., travelling salesman) in  $O(1)$  for the system, with estimated gains of  $1000\times$  to  $10000\times$  over CPUs.

## 9 Resource Management and Industry

### 9.1 Structural failure prediction

Sensors of vibration, strain and temperature on bridges, aircraft, turbines. Normalisation with  $T = K_{\min}$  (rest state). IDT\* increases with wear; STOP signals the critical intervention point (avoiding Phase 4).

### 9.2 Predictive maintenance

Applied to industrial machinery: vibration, temperature, pressure. IDT\* rises to Phase 4; STOP indicates component replacement.

### 9.3 Electrical grid and renewable energy

Forecasting wind and solar power: normalise variability. High IDT\* indicates grid saturation; STOP anticipates storage needs or reserve activation.

### 9.4 Dam and flood management

Water level, inflow, precipitation in the basin. Hydrological IDT\* rises with soil saturation; STOP warns of imminent overflow.

## 10 Public Health and Epidemics

### 10.1 Outbreak forecasting

Number of cases, transmission rate, hospital capacity.  $T = K_{\min}$  (period with no cases). IDT\* increases during accumulation; STOP precedes the peak, allowing interventions (lockdown, vaccination).

### 10.2 Personalised medicine (wearables)

Heart rate, heart rate variability, temperature, blood oxygen normalised in a moving window. IDT\* outside the range  $[0.70, 0.95]$  alerts the user or physician. Early sepsis detection is possible hours before clinical symptoms.

### 10.3 Drug supply chains

Tension in the supply chain (stock, shelf-life, logistics) read with the same equations. STOP signals imminent rupture.

## 11 Daily Life, Logistics and Mobility

### 11.1 Urban traffic

$T$  = minimum traffic flow hour (e.g., 120 vehicles/h). Normalisation of peak hours gives IDT\* = 0.854 (Phase 4). STOP = congestion. The same applies to air traffic (slots,



delays) and parking.

## 11.2 Bread recipe

$T$  = water (7 g). Normalisation of flour (500 g), salt, yeast, time gives  $IDT^* = 0.821$  (Phase 4).  $T_{eq} \approx 201$  g – optimal hydration point.

## 11.3 Agriculture and food security

- Pest prediction: temperature, humidity, crop cycle. High  $IDT^*$  (Phase 3) precedes pest outbreak.
- Irrigation: soil water tension ( $K_m$  = normalised moisture). STOP = critical time for irrigation.
- Soil quality: pH, nutrients, organic matter normalised.  $IDT^*$  detects imbalances before harvest loss.

# 12 Conclusion

The examples presented show that POLIS V12 is not limited to geophysical or atmospheric phenomena. The same universal equation, the same normalisation  $T = K_{min}$  and the same STOP criterion are capable of reading structural tension in biology, medicine, economics, cosmology, physics, chemistry, mathematics, computing, engineering, resource management, public health, logistics and daily life.

The theory does not replace domain-specific models; it offers a **common language** to detect saturation, predict turning points, and intervene at the optimal moment. Scale does not matter – only tension.

## Data Availability

All data used in the validations are publicly available from their respective sources (IPMA, USGS, Eurostat, World Bank, CoinGlass, NASA, etc.). The main POLIS V12 treatise is available on Zenodo (DOI: 10.5281/zenodo.19618276).

## References

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