POLIS V12: The Complete Classical Physics Series – 12 Giants

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This document combines two companion papers:
"Tensional Reinterpretation of Six Founders of Classical Physics"
and "Tensional Reinterpretation of Six More Classical Physics Pioneers".

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POLIS V12 – Tensional Reinterpretation of Six Founders of Classical Physics Jorge Batista Alves Pereira
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Abstract

Within the POLIS V12 tensional ontology, every physical system is a polis constituted by three meshes (solid, liquid, gaseous) and governed by the closure condition $\epsilon = \sum K_m(2 + K_m) = 0$, with $T = K_{\min}$ as the tensional origin. This paper applies the framework to six foundational figures of classical physics: Galileo Galilei (kinematics), Isaac Newton (laws of motion and gravitation), Michael Faraday (electromagnetic fields), James Clerk Maxwell (unified electromagnetism), William Thomson (Lord Kelvin, thermodynamics), and Daniel Bernoulli (fluid dynamics). Each classical contribution is reinterpreted as a tensional configuration: Galileo's falling bodies as linear K increase; Newton's three laws as tensional axioms; Faraday's lines of force as mesh vectors; Maxwell's equations as four tensional conditions; Kelvin's absolute zero as $K = 0$ limit; and Bernoulli's principle as K conservation in flow. The universal equations remain unchanged; no free parameters are introduced.

1 Introduction

POLIS V12 is a closed, parameter-free tensional conservation theory built on four axioms (Tensional Ontology, Harmonic Ground $H = 1$, Tensional Conservation, Data Origin $T = K_{\min}$). The governing equation, after normalisation, is

$$\epsilon = \sum_{m=1}^{n} K_m(2 + K_m) = 0,$$

with $K_m = (v_m - T)/(v_{\max} - T) \in [0, 1]$. The disequilibrium index is $\mathrm{IDT}^* = \epsilon/(1 + \epsilon)$. All real physical systems reside in Phase 4 ($\mathrm{IDT}^* \geq 0.70$) unless artificially uniform. The Rolling Law $2\pi r_p = V_{\mathrm{orb}} T_{\mathrm{rot}}$ applies fractally at all scales.

This paper reinterprets six key contributions to classical physics within this tensional ontology. No classical primacy is assumed; tension is the primitive.

2 Galileo Galilei – Kinematics and Falling Bodies

Galileo's experiments with inclined planes showed that distance fallen is proportional to t^2. In POLIS V12, the velocity $v = dK/dt$ (instantaneous tensional flux). Constant acceleration means $a = d^2K/dt^2$ constant. The equation of free fall: $K = \frac{1}{2}at^2$ after setting initial $K = 0$. Galileo's law of inertia (a body continues in uniform motion unless acted by a force) is the tensional conservation of K in the absence of external tension. The inclined plane reduces acceleration, allowing measurement of a at lower K.

Galileo's principle of relativity (the laws of physics are the same in all inertial frames) means that the normalisation T and $v_{\max}$ are the same for any moving observer at constant velocity.

3 Isaac Newton – Laws of Motion and Universal Gravitation

Newton's three laws: (1) inertia (law 1), (2) $F = ma$ (law 2), (3) action-reaction (law 3). In POLIS V12, force is a tensional gradient ∇K. The second law becomes $\nabla K = m \cdot d^2K/dt^2$ (but mass m is a conversion factor from tensional to inertial units). Universal gravitation: $F = GMm/r^2$ is the tensional flux between two polises: $VT = GMm/r^2$. Newton's derivation of Kepler's laws from the inverse-square law is a tensional demonstration of the Rolling Law.

The action-reaction law ensures that ϵ of an isolated two-body system is conserved ($\Delta\epsilon = 0$). The concept of inertia (a body alone has constant K) is a tensional baseline.

4 Michael Faraday – Electric and Magnetic Fields

Faraday introduced lines of force to visualise electric and magnetic fields. In POLIS V12, a line of force is a tensional streamline: the path along which K is constant (equipotential). Faraday's law of electromagnetic induction (changing magnetic flux induces EMF) is a tensional conservation: $\oint E \cdot dl = -d\Phi_B/dt$ means that a changing K in the magnetic mesh produces a circulational K in the electric mesh. His "dielectric stress" is the local K_{stress} in the gaseous mesh. The Faraday cage (shielding) is a solid mesh that blocks external K fields.

Faraday's discovery of the magneto-optical effect (rotation of polarisation by magnetic field) shows coupling between two gaseous meshes (light and magnetism). Uneducated mathematically, Faraday used physical intuition; POLIS V12 provides the structural language.

5 James Clerk Maxwell – Unified Electromagnetism

Maxwell's equations unify electricity and magnetism. In POLIS V12, they describe the dynamics of tensional fields: - Gauss's law: $\nabla \cdot E = \rho/\epsilon_0$ – divergence of electric K equals source K. - Gauss's law for magnetism: $\nabla \cdot B = 0$ – no magnetic monopoles (zero net K). - Faraday's law: $\nabla \times E = -\partial B/\partial t$ – curl of electric K equals change in magnetic K. - Ampère–Maxwell: $\nabla \times B = \mu_0 J + \mu_0\epsilon_0 \partial E/\partial t$ – curl of magnetic K equals current plus displacement current. Maxwell's displacement current ($\partial E/\partial t$) adds a tensional term that allows wave solutions. The speed of light $c = 1/\sqrt{\mu_0\epsilon_0}$ is the tensional saturation speed of the electromagnetic mesh.

6 William Thomson (Lord Kelvin) – Thermodynamics and Absolute Zero

Kelvin formulated the Second Law of Thermodynamics and the absolute temperature scale. In POLIS V12, absolute zero $0K$ is the state where $K = 0$ (no molecular motion).

The Kelvin scale is linear: T (in K) $\propto$ average kinetic K. The Second Law states that $\Delta\epsilon \geq 0$ for an isolated system; entropy S is a measure of ϵ. The Carnot efficiency $\eta = 1 - T_{\text{cold}}/T_{\text{hot}} = 1 - K_{\text{min}}/K_{\text{max}}$. The "heat death" of the universe is when ϵ reaches a maximum (Phase 3 saturation). Kelvin's work on submarine cables (telegraphy) applied tensional propagation of signals.

The Joule–Thomson effect (cooling of expanding gas) is a Phase 5 expansion into a lower K region.

7 Daniel Bernoulli – Fluid Dynamics and Bernoulli's Principle

Bernoulli's principle states that in an ideal fluid, $p + \frac{1}{2}\rho v^2 + \rho g h = \text{constant}$. In POLIS V12, the fluid is a liquid mesh with K_{pressure} (static), K_{kinetic} (motion), and $K_{\text{potential}}$ (height). Bernoulli's equation is a conservation of total K along a streamline: $K_{\text{total}} = K_{\text{pressure}} + K_{\text{kinetic}} + K_{\text{potential}} = \text{constant}$. The Venturi effect (pressure drop in constriction) occurs because K_{kinetic} increases, so K_{pressure} must decrease. The lift on an aerofoil (higher velocity on top, lower pressure) is a tensional gradient.

Bernoulli's kinetic theory of gases related pressure to molecular motion (K). His "hydrodynamica" laid foundations for fluid mechanics.

8 Conclusion

The six foundational contributions to classical physics are coherently reinterpreted within the POLIS V12 tensional ontology. Kinematics, laws of motion, field theory, electromagnetism, thermodynamics, and fluid dynamics all become natural consequences of the closure condition $\epsilon = \sum K_m(2 + K_m) = 0$ and the fractal hierarchy of physical polises. No free parameters are added.

Zenodo references

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Abstract

This paper extends the POLIS V12 tensional reinterpretation to six additional classical physics giants: Blaise Pascal (hydrostatics), Charles-Augustin de Coulomb (electrostatics), André-Marie Ampère (electrodynamics), Georg Ohm (circuit law), James Prescott Joule (energy conservation), and Heinrich Hertz (electromagnetic waves). Each is re-read as a tensional configuration: Pascal's 'principle as equal K transmission; Coulomb's inverse-square as tensional flux; Ampère's force as interaction of current meshes; Ohm's law as linear K relation; Joule's equivalence as ϵ conversion; and Hertz's waves as oscillating K field. The universal equations remain unchanged; no free parameters are introduced.

9 Introduction

As in the companion paper, POLIS V12 rests on four axioms. After normalisation the mother equation is

$$\epsilon = \sum_{m=1}^{n} K_m(2 + K_m) = 0,$$

with $\text{IDT}^* = \epsilon/(1 + \epsilon)$. All real physical systems are in Phase 4 ($\text{IDT}^* \geq 0.70$) unless artificially uniform. The Rolling Law $2\pi r_p = V_{\text{orb}} T_{\text{rot}}$ applies fractally.

This paper reinterprets six more foundational contributions to classical physics.

10 Blaise Pascal – Hydrostatic Pressure

Pascal's principle: pressure applied to a confined fluid transmits equally throughout. In POLIS V12, a static fluid is a liquid mesh where the tensional load T (pressure) is constant in all directions. Pascal's law: K_{pressure} is the same at all points in the fluid at the same height. The hydraulic press multiplies force: $F_{\text{out}}/A_{\text{out}} = F_{\text{in}}/A_{\text{in}}$ – a tensional division of K by area ratio. Pascal's barometer (mercury column) measures atmospheric K_{pressure}. The "Pascal's paradox" (burst barrel of wine) demonstrates that a small force can create huge K due to column height.

His work on cycloid curves (geometry) also contributed to tensional calculus.

11 Charles-Augustin de Coulomb – Electrostatic Force

Coulomb's law: $F = kq_1q_2/r^2$. In POLIS V12, electric charge q is a scalar K (excess or deficit of electrons). The force is the tensional flux between two charges: $VT = kq_1q_2/r^2$. Coulomb used a torsion balance to measure K. The inverse-square dependence on distance matches Newton's gravity, showing that both electric and gravitational polises follow the same tensional scaling. The concept of "Coulomb friction" (dry friction) is $F_{\text{friction}} = \mu N$, a tensional resistance proportional to the normal K.

Coulomb's work on soil mechanics (earth pressure) also applied tensional analysis.

12 André-Marie Ampère – Electrodynamics and Ampère's Law

Ampère discovered that parallel currents attract, antiparallel repel. In POLIS V12, a current I is a flow of K (charge per time). Ampère's force law: $dF = (\mu_0/4\pi) I_1 I_2 \, dl_1 \times (dl_2 \times \hat{r})/r^2$ is a tensional interaction between two current elements. Ampère's law (magnetic field from current): $\oint B \cdot dl = \mu_0 I$ – the circulation of magnetic K equals the enclosed current K. The "Ampère's circuital law" is a tensional integral of the magnetic mesh.

The SI unit of current (ampere) is based on the constant μ_0. Ampère also invented the solenoid (coil to concentrate magnetic K).

13 Georg Ohm – Ohm's Law and Circuit Theory

Ohm's law: $V = IR$. In POLIS V12, voltage V is a difference in electric K (potential), current I is the flow of K (charge per time), and resistance R is the opposition to flow ($K_{\text{resistivity}}$). The law states $I = V/R$, i.e., $K_{\text{current}} = \Delta K_{\text{potential}}/K_{\text{resistance}}$. Ohm's law is linear (constant R for many materials). For resistors in series, $R_{\text{total}} = \sum R_i$ (additive K); in parallel, $1/R_{\text{total}} = \sum 1/R_i$ (additive conductance). Ohm's law is a tensional relation analogous to $F = ma$ but in the electrical mesh.

The "Ohm's law" analogy between heat flow, fluid flow, and electric current demonstrates tensional universality.

14 James Prescott Joule – Conservation of Energy

Joule measured the mechanical equivalent of heat, establishing energy conservation. In POLIS V12, energy is the integral of K over degrees of freedom. Joule's paddlewheel experiment: falling weights ($K_{\text{potential}}$) turn paddles in water, raising water temperature (K_{thermal}). The equivalence $4.184 J = 1 cal$ means that $K_{\text{mechanical}}$ and K_{thermal} are convertible. Joule's law for resistive heating: $P = I^2 R$ – power P (rate of K production) equals the square of current times resistance. This is a tensional dissipation (Phase 4) into heat.

Joule's work led to the First Law of Thermodynamics: $\Delta U = Q - W$ (change in internal K = heat K added – work K done by system). Energy conservation is the statement that total ϵ (over all meshes) is constant in a closed system.

15 Heinrich Hertz – Electromagnetic Waves

Hertz generated and detected radio waves, confirming Maxwell's theory. In POLIS V12, an electromagnetic wave is an oscillating tensional field where electric K and magnetic K propagate at speed c. Hertz's spark gap transmitter emitted waves; his receiver (coil with gap) detected them. The wave's wavelength $\lambda = c/f$ relates to the frequency f (rate of K oscillation). Hertz demonstrated reflection, refraction, polarisation – all tensional behaviours. The "Hertz oscillator" (dipole antenna) is a polis that converts electric K into radiation K.

The unit of frequency (hertz, Hz) is cycles per second (tensional cycles). Hertz's photoelectric effect (UV light increases spark length) hinted at quantum K quantisation, leading to Planck and Einstein.

16 Conclusion

Six additional classical physics pioneers are reinterpreted within the POLIS V12 tensional ontology. Hydrostatics, electrostatics, electrodynamics, circuit theory, energy conservation, and electromagnetic waves all become natural consequences of the closure condition $\epsilon = \sum K_m(2 + K_m) = 0$ and the fractal hierarchy of physical polises. No free parameters are added; the same equations that describe a chemical reaction or a biological cell also describe the classical laws of physics.

Zenodo references

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