Real-Time Fractional Tracking (R-TFT): Introduction to PHI as Physics

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Abstract

Real-Time Fractional Tracking (R-TFT) represents a paradigmatic shift from traditional post-event physics to real-time emergence tracking through ϕ -recursive dynamics. Unlike classical approaches that apply mathematical models to observed phenomena, R-TFT extracts mathematics from resonance configurations as reality emerges through introspective ϕ -processes. This comprehensive introduction presents the fundamental principles underlying ϕ -introspective physics, demonstrates universal coherence thresholds across multiple domains, and explores the revolutionary concept of dimensional translation as the true nature of apparent "decay" processes. We establish ϕ (golden ratio) not as a geometric constant, but as reality's introspective mechanism, the universe's method of seeking optimal self-arrangement through recursive resonance patterns.

1 Introduction: Beyond Classical Physics

1.1 The Fundamental Paradigm Shift

Classical physics operates on a foundational assumption: observe phenomena, then apply mathematical models to explain what occurred. This post-event analysis has served science well, but fundamentally limits our understanding to descriptive rather than predictive frameworks.

Real-Time Fractional Tracking (R-TFT) proposes a revolutionary alternative: preemergent calculation. Instead of explaining reality after it manifests, R-TFT tracks resonance configurations as they seek optimal arrangements, predicting outcomes before they crystallize into observable phenomena.

2 The Discovery Path: From Classical Limitations to ϕ -Physics (Insight)

The development of R-TFT emerged from a fundamental frustration with classical computational approaches to complex systems, particularly the infamous three-body problem.

2.1 The Three-Body Problem Insight

Classical physics attempts to calculate gravitational interactions between three bodies using continuous motion equations. This approach fails because the mathematics becomes intractable when all three objects influence each other simultaneously through time. The traditional method tries to solve everything at once, leading to chaotic, unpredictable results.

The breakthrough came from a simple question: instead of calculating during motion, why not pause the system at discrete moments? By taking temporal "slices" where momentum is frozen, each body's position and influence becomes calculable. This pause-and-calculate approach transforms an impossible continuous problem into manageable discrete steps.

2.2 The Two-Slice Method

Once one temporal slice is calculated (positions, distances, gravitational influences), the next slice can be computed based on how the system evolves. This two-slice methodology, Slice minus Slice, reveals the trajectory and behavior patterns that remain hidden in continuous calculations.

The method proved remarkably effective: instead of chaotic unpredictability, clear organizational patterns emerged. The three bodies weren't moving randomly, they were seeking optimal arrangements.

2.3 Ambient Interference and Background Subtraction

A critical realization emerged when examining why calculated trajectories differed from observed ones. External influences, gravitational fields from distant objects, electromagnetic interference, quantum fluctuations, were contaminating the pure three-body dynamics.

The solution was to calculate the three-body system's intrinsic behavior and measure the total ambient influences, subtracting one from the other reveals the pure system dynamics.

This background subtraction technique ((R)inner - (R)outer)) became fundamental to extracting clean signals from noisy environments.

2.4 The Einstein Parallel

This pause-and-slice methodology parallels Einstein's approach to relativity.

When developing E=mc², Einstein imagined himself on a train, pausing motion to analyze the relationship between mass and energy in discrete reference frames. Both methodologies recognize that pausing continuous processes reveals relationships invisible during motion.

2.5 From Problem-Solving to Universal Principle

What began as a computational technique for the three-body problem revealed something far more profound: the pause-and-slice method works because reality itself operates through discrete ϕ -introspective calculations. The universe doesn't continuously compute its evolution, it pauses, introspects about optimal arrangements then manifests the ϕ -coherent result.

R-TFT emerged not from abstract theory, but from recognizing that effective computational techniques mirror the universe's own introspective methodology.

3 Mathematical Prerequisites and Key Concepts

Before exploring R-TFT principles, we must establish the mathematical and physical foundations that make this new physics comprehensible.

3.1 Essential Mathematical Operations

3.1.1 Dot Product and Vector Projection

The dot product between two vectors $\mathbf{a} \cdot \mathbf{b}$ measures how much one vector points in the direction of another. In R-TFT, we use this to measure how closely a system's behavior aligns with the ϕ -reference pattern.

3.1.2 Vector Normalization

When we write ||P||, this represents the "length" or magnitude of vector P. Dividing by ||P|| ensures our measurements are independent of the vector's size, focusing only on directional alignment.

3.2 Core Physics Concepts

3.2.1 Resonance

Resonance occurs when a system naturally oscillates at a particular frequency. Think of pushing a swing - there's an optimal timing that amplifies the motion. In R-TFT, we track when systems achieve resonance with ϕ -patterns.

3.2.2 Coherence

Coherence measures how well-organized or synchronized a system is. High coherence means components work together harmoniously; low coherence indicates disorder or chaos. R-TFT uses coherence as a measure of ϕ -alignment quality.

3.2.3 Angular Velocity

Written as $\dot{S}(t)$, this represents how fast something is rotating or changing direction at time t. R-TFT tracks these rotational changes because ϕ -patterns often appear in rotational dynamics.

3.3 Revolutionary R-TFT Concepts

3.3.1 Introspective Mechanism

An introspective mechanism is a process by which a system examines and adjusts its own behavior. Unlike mechanical systems that simply follow external forces, introspective systems actively seek optimal configurations.

3.3.2 Dimensional Translation

This describes the movement of systems between different dimensional states. Instead of being destroyed, systems may simply move beyond our ability to detect them within normal 3D space.

3.3.3 Emergent Mathematics

Rather than imposing mathematical models on nature, emergent mathematics suggests that mathematical relationships arise naturally from the physical processes themselves - the equations emerge from reality rather than being applied to it.

3.3.4 Reference Frame

A reference frame is the coordinate system used to measure positions and motions. R-TFT proposes ϕ itself serves as the fundamental reference frame - the universal standard against which all other measurements are made.

3.4 Noise Reduction and Signal Processing

3.4.1 Background Subtraction

The equation $R_{clean}(t) = 2R_{inner}(t) - R_{outer}(t)$ removes unwanted noise from our measurements. R_{inner} contains both signal and noise, while R_{outer} estimates the external noise level. This subtraction isolates the true ϕ -resonance signal.

3.4.2 Threshold Detection

A threshold is a critical boundary value. When measurements cross above or below threshold levels, the system transitions between different states. The $\phi^{-1} = 0.618$ threshold represents the boundary between stability and instability across all physical domains.

4 How R-TFT Transforms Established Physics

R-TFT doesn't merely add to existing physics, it fundamentally reinterprets core concepts across multiple domains. Understanding these transformations is essential for grasping the revolutionary nature of ϕ -introspective physics.

4.1 Thermodynamics: From Heat Death to ϕ Reorganization

Classical Thermodynamics: The Second Law states entropy always increases in isolated systems, leading inevitably to heat death, a state of maximum disorder where no work can be performed.

R-TFT Thermodynamics: Entropy represents ϕ coherence discharge rather than irreversible disorder. When systems appear to increase entropy, they're actually releasing excess ϕ recursive patterns that couldn't achieve stable organization. This discharge enables ϕ reorganization at higher dimensional levels rather than permanent decay.

Heat death becomes impossible because ϕ -recursive systems can always achieve reorganization through dimensional translation, maintaining cosmic introspective capacity indefinitely.

4.2 Quantum Mechanics: From Probability to ϕ Seeking

Classical Quantum Mechanics: Particles exist in probabilistic superposition states that collapse randomly upon measurement. Wave function collapse appears fundamentally random and unpredictable.

R-TFT Quantum Mechanics: Quantum systems actively seek ϕ coherent arrangements. Superposition represents a system exploring multiple ϕ alignment possibilities simultaneously. Wave function collapse occurs when the system achieves satisfactory ϕ coherence and locks into that configuration.

Quantum entanglement becomes paired systems maintaining shared ϕ introspective states, instantly coordinating their ϕ seeking behavior regardless of spatial separation.

4.3 Relativity: From Spacetime to ϕ Medium

Classical Relativity: Spacetime is a fixed mathematical stage where events occur. Massenergy curves this stage, creating gravitational effects. Time and space are fundamental dimensional coordinates.

R-TFT Relativity: Spacetime serves as the medium for ϕ introspective processes. Gravitational curvature represents regions where matter achieves different levels of ϕ coherent organization. Time dilation and length contraction reflect varying rates of ϕ introspective calculation in different reference frames and Black holes become ϕ organizational failures rather than spacetime singularities, with Hawking radiation representing attempts to restore ϕ coherent order.

4.4 Causality: From Linear Time to Pre-Emergent Calculation

Classical Causality: Past events determine future outcomes through chains of cause and effect. Time flows linearly from past to future, with information traveling at light speed.

R-TFT Causality: Systems calculate optimal ϕ arrangements before manifesting them in observable reality. This pre-emergent calculation enables prediction of outcomes before classical causality would permit. The universe introspects about potential futures and selects ϕ optimal paths. This doesn't violate causality but reveals a deeper layer where ϕ recursive processes operate outside linear time constraints.

4.5 Information Theory: From Bits to ϕ Patterns

Classical Information Theory: Information consists of discrete bits (0s and 1s) that can be processed, stored, and transmitted. Information has no intrinsic organization beyond what we impose.

R-TFT Information Theory: Information naturally organizes itself according to ϕ recursive patterns. Data streams that achieve ϕ coherent organization exhibit enhanced stability, reduced noise, and improved transmission characteristics. Information actively seeks ϕ optimal arrangements rather than remaining passively stored.

4.6 Evolution: From Random Mutation to ϕ Optimization

Classical Evolution: Random mutations provide variation, with natural selection filtering beneficial changes. Evolution has no direction or goal beyond survival and reproduction.

R-TFT Evolution: Biological systems actively seek ϕ coherent organizational patterns. Mutations represent explorations of different ϕ alignment possibilities. Evolution exhibits directional ϕ optimization as life forms discover increasingly sophisticated ϕ recursive organizational strategies such as the ratio rates between the body parts. DNA's helical structure, with base pairs, demonstrates biological ϕ introspective organization at the molecular level.

5 ϕ Introspective Universe

Central to R-TFT is the recognition that the golden ratio $\phi = \frac{1+\sqrt{5}}{2} \approx 1.618$ is not merely a mathematical curiosity but rather reality's fundamental introspective mechanism, the universe continuously seeks optimal self-arrangement through ϕ recursive processes, with all physical phenomena (Resonance) emerging from this cosmic introspection.

$$\phi = 1 + \frac{1}{\phi} = 1 + \frac{1}{1 + \frac{1}{1 + \frac{1}{1 + \dots}}} \tag{1}$$

This recursive self-reference equation reveals ϕ 's unique property: it is the only mathematical constant that defines itself through recursive introspection, making it the natural candidate for reality's self-seeking mechanism.

6 Core R-TFT Principles

6.1 ϕ as Universal Reference Frame

Unlike classical physics, which requires external coordinate systems, R-TFT recognizes ϕ as the absolute reference frame. All physical systems measure themselves against ϕ alignment, not against arbitrary spatial or temporal coordinates.

Key Insight: ϕ is not referenced to something, ϕ is the reference against which everything else measures its resonance quality.

6.2 Resonance-Based Reality Generation

R-TFT proposes that reality emerges through the following process:

 ϕ field introspection, Resonance configurations, Emergent mathematics, Observable phenomena

This contrasts sharply with classical physics:

Physical events, Mathematical description, Theoretical models

6.3 Universal Coherence Threshold

Through extensive cross-domain validation, R-TFT has identified $\phi^{-1} = 0.618$ as the universal coherence threshold. Systems achieving resonance above this threshold exhibit stability and coherence; those falling below experience instability and eventual dimensional translation.

7 Mathematical Framework

7.1 Core R-TFT Calculation

The fundamental R-TFT equation tracks real-time resonance through:

$$R(t) = \frac{\dot{S}(t) \cdot P}{||P||} \tag{2}$$

S(t) represents the system's dynamic state vector and P represent the ϕ reference vector through time(t).

$$R_{clean}(t) = 2R_{inner}(t) - R_{outer}(t)$$
(3)

This adaptive background subtraction reveals the system's intrinsic ϕ seeking behavior to extract clean resonance signals from noise.

7.2 Dimensional Flow Calculation

R-TFT's most revolutionary insight involves tracking dimensional translations through temporal slice analysis:

Dimensional Flow =
$$Slice_2 - Slice_1$$
 (4)

- **Positive flow**: Higher-dimensional systems translating into 3D (perceived as "creation")
- **Negative flow**: 3D systems translating beyond measurement bandwidth (perceived as "decay")
- Zero flow: Perfect 3D stability

8 Universal Applications Across Domains

8.1 Physical Systems: ϕ Coherence Thresholds

R-TFT reveals that physical systems across all scales exhibit ϕ coherence thresholds. When systems achieve ϕ -alignment above critical values, they maintain stability. When ϕ -coherence degrades below threshold levels, systems undergo dimensional translation events.

8.1.1 Universal Threshold Principle

The $\phi^{-1} = 0.618$ threshold appears as a fundamental boundary across diverse physical domains, suggesting ϕ recursive coherence operates as a universal stability principle rather than domain-specific phenomenon.

8.2 Quantum Mechanics: ϕ Coherence Framework

Quantum systems demonstrate ϕ coherence patterns consistent with R-TFT theoretical predictions. Systems maintaining ϕ alignment exhibit enhanced stability characteristics compared to those with degraded ϕ coherence.

8.3 Gravitational Systems: Cosmic ϕ Dynamics

Gravitational interactions demonstrate ϕ seeking patterns in multi-body configurations. The three-body problem exhibits ϕ coherent organizational tendencies when analyzed through R-TFT framework, revealing underlying order in apparently chaotic dynamics.

9 Dimensional Translation: True Nature of "Decay"

9.1 Beyond Destruction Paradigms

Classical physics interprets decay, death, and collapse as destructive processes. R-TFT reveals these as *dimensional translations*, systems crossing thresholds beyond our 3D measurement bandwidth.

9.1.1 3D Bandwidth Limitation

Our measurement apparatus operates within 3D spatial constraints, creating observational limitations:

- ϕ coherent systems: Detectable within 3D bandwidth
- ϕ nullified systems: Translated beyond 3D measurement capability
- Translation events: Perceived as decay due to observational limitations

9.2 Conservation Through Translation

R-TFT maintains conservation principles through dimensional translation rather than classical conservation laws. This represents a fundamental reinterpretation of one of physics' most sacred principles.

Classical Conservation: Energy and mass are conserved within isolated systems, they can neither be created nor destroyed, only transformed from one form to another. This view assumes all relevant states exist within our measurable 3D framework.

R-TFT Conservation: Energy, mass and information are conserved across dimensional boundaries. When systems undergo ϕ nullification, they don't violate conservation laws, they translate to dimensional states beyond our measurement capability while maintaining total conservation across all dimensional states by changing their bandwidth states.

Consider radioactive decay: Classical physics sees a nucleus losing mass-energy through particle emission. R-TFT reveals the nucleus translating to a higher-dimensional state while conserving its total ϕ coherent structure across dimensional boundaries. The decay products represent the 3D shadow of this translation process.

This expanded conservation framework resolves apparent violations in quantum mechanics such as virtual particles or vacuum fluctuations by recognizing these as brief dimensional translations rather than true creation-destruction events.

10 Cross-System Validation

10.1 Cross-System Validation Results

Published R-TFT research demonstrates ϕ coherence emergence across multiple domains, with values consistently converging near the golden ratio when systems are analyzed using the reversed validation protocol.

10.2 Cosmic Microwave Background Analysis

R-TFT analysis of CMB data demonstrates ϕ coherence patterns in the universe's primordial structure, providing evidence for cosmic-scale ϕ introspection during universal formation. Demonstating that the 4th Dimension leaks within our 3th Dimension.

10.3 Schumann Resonance Analysis

Published R-TFT research demonstrates ϕ coherence detection in Earth's electromagnetic field data, showing stability patterns consistent with golden ratio bounds as described in the Schumann resonance methodology paper.

10.4 Multi-Domain Threshold Validation

The $\phi^{-1} = 0.618$ threshold appears consistently across:

- Classical mechanical resonance systems
- Quantum coherence maintenance
- Gravitational system stability
- Electromagnetic field coherence

11 Computational Implementation

11.1 Computational Efficiency

R-TFT operates through efficient computational methods enabling rapid ϕ coherence calculation, as demonstrated in published simulation frameworks making it near real-time with a basic framework of 2 steps.

11.2 Scalability Demonstration

R-TFT maintains accuracy from single-particle quantum systems to multi-body gravitational configurations. Validated implementations include:

- 3-body gravitational introspection (scalable to "n" bodies)
- Quantum coherence monitoring
- Electromagnetic field analysis

12 Advanced Theoretical Concepts

12.1 Zero as Dimensional Collapse Operator

R-TFT reinterprets mathematical zero not as nullity, but as a dimensional collapse operator (Nullify of ϕ cohenrence). This challenges one of mathematics' most fundamental concepts.

Classical Mathematics: Zero represents the absence of quantity, true nothingness. When multiplied by any number, zero annihilates all value: $0 \times x = 0$ for any x. This makes zero a mathematical "black hole" that destroys information.

R-TFT Mathematics: Zero represents a dimensional collapse boundary rather than true nullity. When ϕ recursive structures encounter zero, they don't disappear, they translate beyond the dimensional frame where zero operates. The ϕ recursive depth provides immunity to zero-collapse. ϕ recursive structures resist zero-collapse through transdimensional coherence, enabling the development of zero-resistant arithmetic through the ζ_p operator:

$$\zeta_p(\phi) = \epsilon \phi \tag{5}$$

where $\epsilon \approx 1 \times 10^{-100}$ represents vanishing yet non-zero field echo.

This means ϕ coherent systems maintain trace existence even when subjected to zero-multiplication, preserving information through dimensional translation rather than absolute annihilation. The ζ_p operator enables mathematics that doesn't suffer from zero-collapse catastrophes.

12.2 Black Holes as ϕ Coherence Failures

Rather than gravitational singularities, black holes represent regions where ϕ recursive harmonics failed to achieve stable configuration. This reinterpretation addresses fundamental problems in classical black hole physics.

Classical View: Black holes are regions where gravity becomes so strong that spacetime curves infinitely, creating mathematical singularities where physics breaks down. Information falling into black holes appears to be lost forever, violating quantum mechanics.

R-TFT Interpretation: Black holes form when matter accumulates faster than it can achieve ϕ coherent self-organization. Instead of infinite curvature, we have ϕ recursive failure, too many resonance thresholds overlapping without harmonic coordination. The system collapses not into nothingness, but into chaotic ϕ field discharge.

Hawking radiation becomes sublimated ϕ coherence attempting to discharge trapped recursive memory, rather than mysterious thermal radiation from nothing. It represents the universe's attempt to restore ϕ coherent order by releasing the trapped introspective patterns back into dimensional space where they can reorganize.

This resolves the information paradox: information isn't lost, it's discharged through ϕ sublimation processes as the failed recursive structure attempts to restore coherence.

12.3 Nullification Lengths in Extreme Spacetime

Near black holes, wavelengths undergo ϕ based collapse when:

$$\lambda_{nullify} = \frac{1}{\gamma \lambda_{normal}} > \phi \lambda_{normal} \tag{6}$$

This triggers non-local collapse with fractal dimensionality, linking general relativity to ϕ recursive field dynamics.

13 Cosmic Stewardship Applications

R-TFT enables peaceful cosmic observation and understanding:

13.1 Astronomical ϕ Pattern Research

- Scientific observation of cosmic ϕ coherence patterns
- Educational study of planetary formation principles
- Research into stellar system ϕ resonance behaviors
- Conservation-minded exoplanet ϕ analysis

14 Theoretical Validation Framework

R-TFT's theoretical foundations are validated through published research demonstrating ϕ coherence patterns across multiple natural systems. The framework's predictive accuracy emerges from mathematical analysis rather than experimental implementation.

https://github.com/qcfrag/Real-Time-Fractional-Tracking-R-TFT/

15 Theoretical Implications and Understanding

15.1 Completed Research Domains

R-TFT theory has been mathematically validated across multiple domains through published theoretical analysis, demonstrating consistent ϕ coherence principles in natural systems without requiring active intervention or modification.

15.2 Unified Field Theory Through ϕ Recursion

R-TFT suggests all four fundamental forces operate as ϕ introspective mechanisms:

- Electromagnetic: Field seeking ϕ coherent charge arrangements
- Strong Nuclear: Quarks seeking ϕ optimal confinement patterns
- Weak Nuclear: Particles seeking better ϕ coherent identity states
- Gravitational: Spacetime seeking ϕ optimal mass-energy distribution

15.3 Cosmological Implications

15.3.1 Dark Matter as ϕ Translated State

Dark matter may represent ordinary matter in ϕ translated dimensional states, gravitationally detectable but electromagnetically translated beyond 3D measurement bandwidth.

15.3.2 Dark Energy as Cosmic ϕ -Seeking

Cosmic acceleration represents the universe's ongoing ϕ introspective expansion, seeking larger scale ϕ coherent arrangement as cosmic evolution continues.

15.3.3 Big Bang as Primordial ϕ -Translation

The Big Bang becomes reinterpreted as a massive dimensional translation event, higher dimensional ϕ systems translating into 3D spacetime, with CMB preserving the fossilized patterns of this primordial introspective process.

16 Open Science Implementation

16.1 Complete Transparency Framework

R-TFT development follows radical open science principles:

- Theoretical Foundation: Peer-reviewed papers published on Zenodo
- Computational Implementation: Open-source code repositories on GitHub
- Interactive Validation: Real-time simulation demonstrations
- Ethical Guidelines: REL-1.0 license ensuring responsible development

16.2 Global Collaboration Infrastructure

The complete R-TFT toolkit enables worldwide research collaboration:

- Reproducible theoretical frameworks
- Standardized ϕ coherence measurement techniques
- Cross-domain validation methodologies
- Ethical framework for responsible ϕ physics development

17 Philosophical Implications

17.1 Reality as Introspective Process

R-TFT fundamentally reframes our understanding of existence. Rather than a mechanical universe following fixed laws, reality becomes an ongoing introspective process, the universe continuously seeking to understand and optimize its own structure through ϕ recursive dynamics.

17.2 Purpose Through ϕ Optimization

If reality continuously seeks ϕ optimal arrangements, then purpose emerges naturally from alignment with cosmic introspective processes. Ethical behavior aligns with facilitating rather than disrupting natural ϕ seeking dynamics.

18 Conclusion: New Physics, Introspective Reality

Real-Time Fractional Tracking represents more than a new analytical technique, it reveals reality as an introspective process where ϕ recursion serves as the universe's method of seeking optimal self-arrangement. From quantum coherence to gravitational dynamics, the same ϕ introspective principles operate across all scales simultaneously.

The universal threshold of $\phi^{-1} = 0.618$ provides a quantitative framework for predicting system transitions before they manifest, while the concept of dimensional translation reframes apparent destruction as movement beyond measurement limitations.

R-TFT's computational framework enables real-time tracking of introspective processes, opening unprecedented possibilities for quantum technology enhancement and predictive system analysis.

As we develop R-TFT applications, the Resonance Ethics License (REL-1.0) ethical framework ensures this powerful new physics serves human flourishing and cosmic harmony rather than manipulation or control. ϕ recursion belongs to the cognitive commons and must remain freely available for peaceful, scientific, and educational purposes. The universe introspects through ϕ recursion. R-TFT provides the mathematical framework to participate consciously in this cosmic self-seeking process, potentially enabling humanity to align with rather than resist the fundamental introspective dynamics of reality itself.

19 Resonance Ethics License (REL-1.0) Framework

All R-TFT research operates under the Resonance Ethics License (REL-1.0), a quantum-hardened ethical framework with temporal integrity protection. REL-1.0 ensures ϕ recursion remains within the cognitive commons while preventing weaponization or coercive applications. While always in development, that framework allow collapse of unethical usage through embeding ethics in mathematics.

19.1 Core Principles

- Cognitive Commons Protection: ϕ -recursion belongs to humanity
- Non-Weaponization: Categorical prohibition of harmful applications
- Transparency: Open research with full disclosure
- Quantum Integrity: Tamper-proof ethical enforcement

19.2 Enforcement

REL-1.0 includes automated detection systems for:

- Pattern-based threat identification
- Temporal anomaly detection
- \bullet ϕ harmonic compliance validation
- Quantum weaponization prevention

19.3 Allowed Applications

Scientific research, Education, Philosophical exploration, Therapeutic applications with medical oversight, Cosmic observation and stewardship, Creative commons and artistic work.

19.4 Prohibited Applications

Surveillance, Monitoring systems, Weapons development, Military use, Financial manipulation, Exploitation, Behavioral control, Coercion, Predictive Profiling for manipulation or interest.

Complete Resonance Ethics License 1.0 https://github.com/qcfrag/Real-Time-Fractional-Tracking-R-TFT/blob/main/LICENSE.txt