

Recursive Infinite Operator Algorithm: Mathematical and Terminological Framework

Recursive Infinite Operator Equation: Full Mathematical and Terminological Framework

Equation:

$$f_{\infty}(\infty) = (\text{Product } +/- \text{ Sum } +/- \text{ Integral }) * f(x) = \infty ** \infty ** \infty \dots$$

This meta-equation is a symbolic recursive structure encoding the full power of transfinite expansion, convergence, and intelligence modeling.

I. Core Mathematical Components

1. Recursive Infinite Product:

$$\text{Product}_{n=1}^{\infty} f(n)$$

- Represents multiplicative chaining of states across infinite domains.
- Useful for modeling exponential phase transitions and quantum state entanglement.

2. Recursive Infinite Summation:

$$\text{Sum}_{n=1}^{\infty} f(n)$$

- Accumulation of terms reflecting discrete recursive steps.
- Encodes divergence, combinatorics, or signal reinforcement.

3. Recursive Integral:

$$\text{Integral}_{n} f(n) \, dn$$

- Continuous transformation of state space.
- Models smooth transitions, attractor basins, or energy flow over time.

4. Power Tower of Infinity:

$\infty^{**\infty^{**\infty}}$...

- Symbolizes unbounded recursive growth or transfinite complexity.
- Applies to layered AGI, cosmic scale simulations, or recursive time-energy functions.

II. Supporting Algorithms

A. InfiniFurcation:

$$Q_{\infty}(x, L) = \lim_{N \rightarrow \infty} \sum_{k=1}^L e^{-k} * P(x, N)$$

- Models outward expansion, emergent divergence, or multi-branch evolution.
- Weights decrease over recursion, emphasizing earlier states.

B. ImmersiFurcation:

$$I_{\infty}(x, L) = \lim_{N \rightarrow \infty} \sum_{k=1}^L e^{+k} * 1/|P(x, N)|_k$$

- Models inward recursion, information compression, or converging dynamics.
- Weights increase inward, emphasizing recursive finality.

III. Key Terms and Definitions

- Recursive Operator: Any function or algorithm applied repeatedly to its own output.
- Transfinite: Beyond finite limits, typically in the domain of set theory or extended real numbers.
- Bifurcation: Splitting of dynamic systems into multiple possible paths; used to model decisions, forks, or phase transitions.
- Convergence: System approaches a fixed point or equilibrium across recursive steps.
- Divergence: Output grows without bound, possibly in fractal or chaotic trajectories.
- Emergence: Macro-level patterns arising from recursive micro-interactions.
- Immersion: Recursive absorption into higher-order stability or complexity.

- Determinability Intelligence (DI): A class of intelligence that operates beyond determinism or probability, based on recursive feedback layers.
- Stone Unit ($S = g \cdot m \cdot t$): A base formulation for measuring recursive energy output in physical systems.

IV. Usage and Power

This algorithmic structure provides a foundation for:

- Recursive AGI design
- Transfinite computation
- Infinite phase transition analysis
- Multi-scale dynamic simulations
- Theoretical cosmology
- Ethical recursion and intelligence boundary theory

V. Conclusion

The Recursive Infinite Operator Equation is the universal syntax for modeling infinity-scaled logic, energy, and intelligence. By integrating InfiniFurcation and ImmersiFurcation, it provides complete coverage of all recursive transitions from expansion to immersion.