## **🧮 Full List of Equations from the Duodecimal Theory**

### **🔢 Base Structure & Evaluation**

#### **1. Base Optimality Equation (B12OE)**

Measures structural efficiency of a base:

**O(n) = (φ(n) + σ(n) + μ(n)) / (H(n) × E(n))**

* φ(n) = Euler’s Totient Function
* σ(n) = Sum of Divisors
* μ(n) = Möbius Function
* H(n) = Number of terminating fractions in that base
* E(n) = Symbolic entropy (e.g., digits per unit information)

#### **2. Intrinsic Regular Base (IRB)**

Finds the lowest base where 1/n terminates:

**I(n) = min { b ∈ ℕ⁺ | ∃ k such that bᵏ mod n = 0 }**

Example:

* 1/7 terminates in base 49 → I(7) = 49

#### **3. Symbolic Entropy Comparison**

Used to compare efficiency of encoding across number bases:

**H\_b = log\_b(N) / d**

Where:

* b = base
* N = numeric value (e.g. speed of light)
* d = number of digits required to represent N in base b

### **🧬 Biological and Quantum Modeling**

#### **4. Cell Cycle Phase Function**

A periodic function describing biological phase shifts:

**f(t) = sin(2πt / 12)**

This divides the cycle into 12 harmonic time steps.

#### **5. Angular Phase Position (Discrete Step Model)**

**θₖ = (2π × k) / 12**, where k = 0 to 11

Used in:

* DNA rotation modeling
* Quantum gate transitions
* Codon phase encoding

### **💡 Resonance & Harmonics**

#### **6. Frequency-based Harmonic Alignment (e.g. 432 Hz)**

General form:  
 **f = b × h**

Where:

* b = base factor (e.g., 12)
* h = harmonic unit (e.g., 36)

Used to explain:

* 432 Hz (12 × 36)
* 864,000 (Sun diameter ≈ 2 × 432,000)

#### **7. Duodecimal Time Division**

Used in automata and solar models:

**T = n / 12**

Where:

* T = time per phase
* n = total interval
* e.g. Jupiter’s 12-year cycle, mitosis pacing

### **📐 Geometric Structuring**

#### **8. Base-Pair Rotation in DNA Spiral**

**Rotation per base = 360° / 12 = 30°**

Used to model 12 base pairs per turn in stable B-DNA.