# Hierarchy from Top Triple to Base-3 Triples

| Level | Name(s) | Internal triples | 3-base coordinates |
|---|---|---|---|
| **Top Triple** | **Gravity – Information – Cognition** | – | – |
| **Plane 1: Gravity** | | **Space – Time – Thought** | |
| | **Space** | – | Topology, Geometry, Scale |
| | **Time** | – | Proper-Duration ($\tau$), Causal-Order ($\chi$), Natural-Phase ($\varphi$) |
| | **Thought** | – | Utility, Processor, Memory |
| **Plane 2: Information** | | **Cyber – Logic – Entropy** | |
| | **Cyber** | – | Connections, Transport, Data |
| | **Logic** | – | Syntax, Semantics, Proof |
| | **Entropy** | – | Configurational, Informational, Intentional |
| **Plane 3: Cognition** | | **Context – Power – Meaning** | |
| | **Context** | – | Domain, Group, State |
| | **Power** | – | Change, Energy, Matter |
| | **Meaning** | – | Form, Narrative, Emotion |

*Summary:* 1 top-level triple $\to$ 3 planes $\to$ 9 mid-level triples $\to$ **33** base-level coordinates.

## Differential Systems for Base-3 Triples

### 1. Gravity Plane

| Triple | Variables | Recommended Form | Example Equations |
|---|---|---|---|
| **Space** | $T$, $G$, $Z$ | Continuum PDE | $\partial_t T = D_T \nabla^2 T + \kappa_T \nabla \cdot (C \nabla T) - \lambda_T E_c$ <br> $\partial_t G = D_G \nabla^2 G + \kappa_G (T - G) - \lambda_G E_i$ <br> $\partial_t Z = D_Z \nabla^2 Z + \kappa_Z |G| - \lambda_Z E_{in}$ |
| **Time** | $\tau$, $\chi$, $\varphi$ | Mixed PDE/ODE | $\partial_t \chi = D_\chi \nabla^2 \chi + a_\chi \nabla \cdot (\Omega \nabla T)$ <br> $\dot{\tau} = a_\tau \Omega - b_\tau E_c$ <br> $\dot{\varphi} = a_\varphi \Omega - b_\varphi E_i$ |

| Thought | $u$, $pr$, $m$ | ODE + integral | $\dot{u} = \alpha_u pr - \beta_u m$ |
|---|---|---|---|
| | | | $\dot{pr} = \alpha_{pr}u(1 - pr/P_{\max}) - \beta_{pr}pr$ |
| | | | $\dot{m} = \alpha_m u - \beta_m m + \int_0^t u(s)e^{-\gamma(t-s)}ds$ |

## 2. Information Plane

| Triple | Variables | Best Form | Example Equations |
|---|---|---|---|
| **Cyber** | $c$, $tr$, $d$ | Graph-PDE / Network Flow | $\dot{c} = -\lambda_c Lc + s_c$ |
| | | | $\dot{tr} = -\lambda_{tr}Ltr + \alpha_{tr}c - \beta_{tr}tr$ |
| | | | $\dot{d} = -\lambda_d Ld + \alpha_d tr - \beta_d d$ |
| **Logic** | $\sigma$, $\mu$, $\pi$ | ODE/Discrete Update | $\dot{\sigma} = \alpha_\sigma c - \beta_\sigma \sigma - \rho_\sigma B$ |
| | | | $\dot{\mu} = \alpha_\mu \sigma - \beta_\mu \mu$ |
| | | | $\dot{\pi} = \alpha_\pi \mu - \beta_\pi \pi$ |
| **Entropy** | $E_c$, $E_i$, $E_{in}$ | Hybrid | $\partial_t E_c = D_{Ec}\nabla^2 E_c + \gamma_c \nabla \cdot (c\nabla T) - \epsilon_c E_c$ |
| | | | $\partial_t E_i = D_{Ei}\nabla^2 E_i + \gamma_i \nabla \cdot (tr\nabla d) - \epsilon_i E_i$ |
| | | | $\dot{E}_{in} = \gamma_{in}|\nabla \eta| - \epsilon_{in}E_{in}$ |

## 3. Cognition Plane

| Triple | Variables | Best Form | Example Equations |
|---|---|---|---|
| **Context** | $D$, $Gr$, $St$ | Compartment ODEs | $\dot{D} = \alpha_D T - \beta_D D$ |
| | | | $\dot{Gr} = \alpha_{Gr}G - \beta_{Gr}Gr$ |
| | | | $\dot{St} = \alpha_{St}Z - \beta_{St}St$ |
| **Power** | $\Delta$, $E$, $M$ | Balance ODE/DAE | $\dot{\Delta} = \alpha_\Delta D - \beta_\Delta \Delta$ |
| | | | $\dot{E} = \alpha_E Gr - \beta_E E$ |
| | | | $\dot{M} = \alpha_M St - \beta_M M$ |
| **Meaning** | $\varphi$, $\eta$, $\psi$ | Delay/Integral ODE | $\dot{\varphi} = \alpha_\varphi \Delta - \beta_\varphi \varphi$ |
| | | | $\dot{\eta} = \alpha_\eta \varphi(t - \tau_d) - \beta_\eta \eta$ |
| | | | $\dot{\psi} = \alpha_\psi \int_0^t \eta(s)e^{-\gamma(t-s)}ds - \beta_\psi \psi$ |

## Summary Table

| Equation Type | Assigned Triples | Rationale |
|---|---|---|
| Continuum PDE | Space, $\chi$, $E_c$, $E_i$ | Vary over space. |
| Graph-PDE | Cyber | Sparse networks. |
| ODE/Stock-Flow | Logic, Thought, Context, Power | Lumped states. |
| Delay/Integral ODE | Memory, Meaning | Memory/history dominate. |
| DAE | Power (Energy, Matter) | Conservation constraints. |