# $X^{\infty}$ – Postmoral and Emotionless Mathematical Foundations of Ethical Governance as a Self-Reinforcing System (Working Paper, Version 1.0)

The Author
x_to_the_power_of_infinity@protonmail.com
X: @tothepowerofinf
GitHub: Xtothepowerofinfinity

April 23, 2025

**Abstract**

The $X^{\infty}$ system redefines responsibility: not as a moral category, but as a mathematically regulated effect. It resolves classical ethical dilemmas through a self-reinforcing model that governs power via feedback and protective mechanisms. This text formalizes the system's foundations, focusing on the Cap logic (authorizations), feedback penalties, and antispeciesism. The goal is a robust, transparent system that distributes responsibility without moral assumptions.

# Contents

1 Introduction 3

1.1 System Objectives . . . 3

1.2 Document Structure . . . 3

2 Responsibility as Effect 3

2.1 Postmoral Perspective . . . 3

2.2 Systemic Consequences . . . 3

3 System Architecture 4

3.1 Flow of Responsibility . . . 4

3.2 Adaptability . . . 4

4 Basic Concepts 4

5 Mathematical Framework 4

5.1 Cap Logic . . . 4

5.2 Historical Authorizations ($\text{Cap}_{\text{past}}$) . . . 4

5.3 Future Performance Capability ($\text{Cap}_{\text{potential}}$) . . . 6

5.4 Feedback Penalties, Returns, and Overrides . . . 7

5.5 Protective Mechanisms . . . 10

6 Antispeciesism 10

7 Conclusion 10

7.1 License . . . 10

# 1 Introduction

The $X^\infty$ system stems from a radical premise: moral categories such as "good" or "evil" are unsuitable for regulating responsibility in complex systems. Instead, $X^\infty$ defines responsibility as *effect*—measurable, mathematically representable, and systemically regulatable. This leads to a *postmoral* approach that replaces ethical governance with structural mechanisms.

## 1.1 System Objectives

- **Fairness through Effect**: Responsibility is distributed not by intent but by actual consequences.
- **Protection of the Weakest**: Weak actors gain a stronger voice through feedback weighting.
- **Antispeciesism**: Humans, non-humans, and the environment are considered equivalent entities.
- **Self-Reinforcement**: The system learns from feedback and adapts without external intervention.

## 1.2 Document Structure

This document formalizes the mathematical foundations of $X^\infty$. Section 2 defines the concept of responsibility, Section 3 outlines the system architecture, Section 4 introduces the notation, Section 5 develops the mathematical framework, Section 6 addresses antispeciesism, and Section 7 concludes with a discussion.

# 2 Responsibility as Effect

In $X^\infty$, responsibility is not a moral obligation but a systemic measure defined by an entity's effect on the system. An entity (individual, organization, environment, AI) bears responsibility for tasks proportional to its capability and receives temporary authorizations.

## 2.1 Postmoral Perspective

Moral judgments often rely on subjective values, leading to conflicts in heterogeneous systems. $X^\infty$ replaces these with objective criteria: *Cap* (authorizations) and *Feedback*. This makes responsibility measurable and independent of cultural or speciesist assumptions.

## 2.2 Systemic Consequences

Those who assume responsibility directly influence the system. Those who misuse it are corrected through penalties (Cap reduction). This creates a balance where authorization is legitimized by responsibility.

# 3 System Architecture

$X^\infty$ is based on three pillars:

- **Cap Logic**: Authorizations (Cap) measure an entity's capabilities based on its responsibility.
- **Feedback**: Weaker entities have greater weight to prevent power concentration.
- **Protective Mechanisms**: $\text{Cap}_{\text{protection}}$ shields vulnerable entities from overburdening.

## 3.1 Flow of Responsibility

Responsibility flows through delegation and return. Entities can delegate tasks but remain accountable for their completion as if they had performed them themselves. Returns are permitted but incur penalties to prevent abuse.

## 3.2 Adaptability

The system adapts through feedback. Positive feedback increases Cap, while negative feedback reduces it. This enables organic development without centralized control.

# 4 Basic Concepts

# 5 Mathematical Framework

## 5.1 Cap Logic

Cap (authorizations) is the central measure of responsibility in $X^\infty$. There are three main types:

- $\textbf{Cap}_{\textbf{past}}$: Historical authorizations based on completed tasks.
- $\textbf{Cap}_{\textbf{potential}}$: Potential authorization assumption based on suitability and historical performance, extended by growth opportunities.
- $\textbf{Cap}_{\textbf{protection}}$: Protection parameter that prevents overburdening.

## 5.2 Historical Authorizations ($\textbf{Cap}_{\textbf{past}}$)

$$\begin{aligned}\text{Cap}_{\text{past}}(E) = \sum \text{Cap}_{\text{solo,final}}(E) + \sum \text{Cap}_{\text{team,final}}(E) \\ + \sum \Delta\text{Cap}_{\text{past,return}}(E) \cdot \frac{1}{D_{\text{hist}}} + \sum \Delta\text{Cap}_{\text{past,comp}}(E) \\ + \sum \Delta\text{Cap}_{\text{past,comp,oversteer}}(E) + \sum \Delta\text{Cap}_{\text{past,bonus}}(E) \\ + \sum \Delta\text{Cap}_{\text{past,feedback}}(E) - \sum \text{Cap}_{\text{past,penalty}}(E) \quad (1)\end{aligned}$$

*In prose:* $\text{Cap}_{\text{past}}$ represents the accumulated historical authorization of an entity—its "performance history" in the system. It grows solely from completed tasks, never from

Table 1: Notation of Parameters

| **Symbol** | **Meaning** |
|---|---|
| $E$ | Entity (individual, organization, environment, AI) |
| $A$ | Task |
| $\text{Cap}_{\text{solo}}(E)$ | Temporary authorizations for self-performed tasks |
| $\text{Cap}_{\text{team}}(E)$ | Temporary authorizations for delegated tasks |
| $\text{Cap}_{\text{aktiv}}(E)$ | Authorizations for active tasks ($\text{Cap}_{\text{solo}} + \text{Cap}_{\text{team}}$) |
| $\text{Cap}_{\text{past}}(E)$ | Historical authorizations |
| $\text{Cap}_{\text{protection}}(E, t)$ | Protection parameter |
| $\text{Cap}_{\text{base}}(E)$ | Inalienable minimum authorizations |
| $\text{Cap}_{\text{BGE}}(E)$ | Basic income |
| $\text{Cap}_{\text{potential}}(E)$ | Future performance capability |
| $\text{Cap}_{\text{potential,aktiv}}(E)$ | Available capacity for additional tasks |
| $M_{\text{pot}}(E, A)$ | Suitability of entity $E$ for task $A$ |
| $D$ | Delegation history ($D_{\text{Entity}} - 1$) |
| $D_{\text{hist}}$ | Historical delegation depth (median of delegation chains) |
| $D_{\text{tiefe}}$ | Current delegation depth |
| $D_{\text{aktuell}}$ | Current delegation depth of a task |
| $B$ | Delegation breadth |
| $k$ | Growth parameter or complexity factor |
| $k_{\text{aktuell}}$ | Current complexity factor of a task |
| $k_{\text{Median}}$ | Median of complexity factors in the system |
| $\alpha, \beta, \lambda, \gamma, \mu, \nu, \phi, \psi, \rho, \theta, \omega, \chi, \delta$ | Model parameters (penalties, feedback, compensation) |
| $S_E, S_S$ | Overrides by $E$, total overrides in the system |
| $R_E, R_{E,\text{delegate}}, R_S$ | Returns (own, by delegates, total) |
| $w_E$ | Feedback weight |
| $F_E, M_E$ | Feedback activity, abuse component |

current (active) tasks. This rule prevents inflating the historical responsibility balance through short-term projects or strategic delegation.

Importantly, $\text{Cap}_{\text{past}}$ is the foundation for $\text{Cap}_{\text{potential}}$ and influences both incentives and the weighting of feedback. An entity that has assumed and successfully borne significant responsibility can structurally gain greater authorizations for future tasks—unless it has exhibited systemically problematic behavior (see penalties and returns).

**Individual Components of $\text{Cap}_{\text{past}}$:**

- $\text{Cap}_{\text{solo,final}}(E)$: Sum of self-completed tasks. *(Independently and operationally completed—highest evaluation level in the system.)*

- $\text{Cap}_{\text{team,final}}(E)$: Sum of tasks completed through delegation. *(Responsibility assumed, but execution (partially) delegated.)*

- $\Delta\text{Cap}_{\text{past,return}}(E)$: Compensation for tasks voluntarily returned. The factor $\frac{1}{D_{\text{hist}}}$ mitigates compensation when returns occur deep in the delegation tree, as responsibility primarily lies with higher-level delegators.

- $\Delta\text{Cap}_{\text{past,comp}}(E)$: Compensation for tasks withdrawn from an entity (e.g., through override or reorganization).

- $\Delta\text{Cap}_{\text{past,comp,oversteer}}(E)$: Specific compensation for the overridden entity, covering accumulated experience before the task was involuntarily withdrawn.

- $\Delta\text{Cap}_{\text{past,bonus}}(E)$: Incentive bonus for entities actively supporting weaker ones. This component rewards targeted support and contributes to system balance.

- $\Delta\text{Cap}_{\text{past,feedback}}(E) = \phi \cdot w_E \cdot F_E - \psi \cdot M_E$: Feedback adjustment. Positive feedback increases $\text{Cap}_{\text{past}}$, while abuse reduces it. This acts as an **emergency brake** against manipulation and irresponsible behavior.

- $\text{Cap}_{\text{past,penalty}}(E)$: Penalties, consisting of:

$$\begin{multline}\text{Cap}_{\text{past,penalty}}(E) = P_{\text{oversteer}}(E) + \Delta\text{Cap}_{\text{past,penalty,return}}(E) \\ + \Delta\text{Cap}_{\text{past,penalty,delegate}}(E) + \Delta\text{Cap}_{\text{past,penalty,k}}(E) \\ + \Delta\text{Cap}_{\text{past,penalty,D}}(E) \quad (2)\end{multline}$$

*In prose:* These penalties prevent entities from gaining unfair advantages. They sanction irresponsible behavior such as frequent returns, failed delegations, overly complex or deeply delegated tasks, and unauthorized overrides. Each penalty is exponentially scaled to punish repeated misconduct more severely, maintaining systemic balance.

## 5.3 Future Performance Capability ($\text{Cap}_{\text{potential}}$)

$$\begin{multline}\text{Cap}_{\text{potential}}(E) = \sum_{j \in \text{Tasks}} M_{\text{pot}}(E, j) \cdot \text{Value}(A_j) \\ \cdot f(D_{\text{hist}}, D_{\text{total}} - D_E, B) \\ \cdot \frac{\text{Cap}_{\text{past}}(E) + \text{Cap}_{\text{BGE}}(E) + \text{Cap}_{\text{base}}(E) - \text{Cap}_{\text{protection}}(E)}{\text{Cap}_{\text{past}}(E) + \text{Cap}_{\text{base}}(E)} \quad (3)\end{multline}$$

*In prose:* $\text{Cap}_{\text{potential}}$ measures the extent of future responsibility an entity can realistically bear. The model considers past achievements ($\text{Cap}_{\text{past}}$), inalienable basic income ($\text{Cap}_{\text{BGE}}$), and the protection level ($\text{Cap}_{\text{protection}}$) that safeguards weaker entities from overburdening.

The protection value $\text{Cap}_{\text{protection}}$ reduces $\text{Cap}_{\text{potential}}$ to ensure vulnerable entities are not pushed into roles they are structurally unprepared for. This eliminates abuse: high protection needs directly limit responsibility allocation.

**Components of the Formula:**

- $M_{\text{pot}}(E, j)$: The potential matrix, describing the suitability of entity $E$ for task $A_j$, derived from qualifications, enthusiasm, and knowledge in the respective domain $\Delta$.

- $\text{Value}(A_j)$: The systemically determined value of a task. Tasks of higher complexity or relevance contribute more to potential calculation.

- $f(D_{\text{hist}}, D_{\text{total}} - D_E, B)$: The growth factor function.

- $D_{\text{hist}}$: Historical delegation depth, indicating experience with project complexity.
- $D_{\text{total}} - D_E$: Current delegation depth of a task relative to the entity—closer to the source increases potential.
- $B$: Delegation breadth—the number of parallel recipients chosen. Prevents strategic dilution of responsibility.

- The fraction in the denominator:

$$\frac{\text{Cap}_{\text{past}}(E) + \text{Cap}_{\text{BGE}}(E) + \text{Cap}_{\text{base}}(E) - \text{Cap}_{\text{protection}}(E)}{\text{Cap}_{\text{past}}(E) + \text{Cap}_{\text{base}}(E)}$$

scales potential based on historical contribution. $\text{Cap}_{\text{base}}$ ensures the denominator is never zero, as inalienable minimum authorizations are always present.

**Key Properties:**

- **Reward for Genuine Performance**: Historical responsibility ($\text{Cap}_{\text{past}}$) enhances authorizations for future tasks.
- **Protection of the Weak**: $\text{Cap}_{\text{protection}}$ prevents systemic overburdening of vulnerable entities.
- **Abuse Prevention**: The combination of protection mechanisms and dynamic limitation of $\text{Cap}_{\text{potential}}$ ensures responsibility is distributed justly.
- **Automatic Balance**: Entities that bear and successfully complete more responsibility gain legitimate allocation rights for future tasks—without manual intervention.

*Prosaic Conclusion:* $\text{Cap}_{\text{potential}}$ is not merely a numerical value but an expression of systemic fairness: it describes an entity's growth opportunities based on genuine performance, considering its protection needs and systemic balance. The model systematically prevents the exploitation of weaker entities and enforces responsibility where it can be borne.

## 5.4 Feedback Penalties, Returns, and Overrides

### 1. Feedback as a Systemic Emergency Brake

$$\Delta\text{Cap}_{\text{past,feedback}}(E) = \phi \cdot w_E \cdot F_E - \psi \cdot M_E \tag{4}$$

*In prose:* Feedback serves as an immediately responsive early warning and correction system. An entity whose behavior becomes systemically problematic (e.g., through delegation abuse or persistent irresponsibility) is promptly sanctioned—directly in $\text{Cap}_{\text{past}}$. This function replaces ethical appeals with mathematically regulated effect correction.

- $\phi$: Amplification factor for constructive feedback. - $\psi$: Penalty factor for destructive or abusive actions. - $F_E$: Evaluated system impact, e.g., through correctly executed feedback. - $M_E$: Abuse indicator—e.g., excessive returns without justification, strategic overrides.

**Purpose:** This immediate effect prevents power accumulation through opacity and ensures feedback operates in real time. Feedback replaces control with effect, protecting the system through direct self-regulation.

### 2. Feedback Weighting: Weaker Voices Matter More

$$w_E = \frac{1}{\text{Cap}_{\text{potential}}(E)} \tag{5}$$

*In prose:* Weaker voices in the system—entities with low $\text{Cap}_{\text{potential}}$—receive greater weight. Their feedback alters the system more directly than that of the "strong." The mathematical expression is the reciprocal feedback weight $w_E$, linking weighting directly to future potential. Since $\text{Cap}_{\text{potential}}$ is never zero due to systemically guaranteed minimum authorizations, the weighting is mathematically stable.

This follows the ethical principle: **The weaker the voice, the more closely it must be heard.**

This prevents systemic bubbles where only established responsibility bearers dominate. Minorities or new participants retain immediate relevance—not because they are formally equal, but because their perspective has a stronger impact in the model.

### 3. Returns—Voluntary but Not Cost-Free

$$\Delta\text{Cap}_{\text{past,penalty,return}}(E) = \mu \cdot \exp\left(\rho \cdot \frac{R_E}{R_S}\right) \tag{6}$$

*In prose:* Entities that voluntarily return tasks immediately lose $\text{Cap}_{\text{aktiv}}(E)$ and face penalties upon task completion. Returns are permitted but not neutral: they cost reputation, trust, and systemic effect. The exponential term $\exp(\rho \cdot \frac{R_E}{R_S})$ ensures frequent returns are more heavily penalized, with $\rho$ controlling penalty severity:

- Returns in a high-responsibility environment carry greater weight. - If many others also return, the individual penalty decreases.

**Purpose:** This creates a system that allows returns without making them attractive. It protects the overburdened while promoting responsibility assumption.

### 4. Penalty for Delegation Failure (Indirect Returns)

$$\Delta\text{Cap}_{\text{past,penalty,delegate}}(E) = \nu \cdot \exp\left(\theta \cdot \frac{R_{E,\text{delegate}}}{R_S}\right) \tag{7}$$

*In prose:* If an entity delegates responsibility and the recipient returns it, this is attributed to the original delegator—not as direct fault but as a failed responsibility chain. The exponential term $\exp(\theta \cdot \frac{R_{E,\text{delegate}}}{R_S})$ penalizes frequent returns by delegates more severely, with $\theta$ controlling penalty severity.

- $R_{E,\text{delegate}}$: Number of returns by delegates. - $\nu$: Base penalty scale—typically lower than for direct returns. - $\theta$: Escalation factor for repeated delegation failures.

**Purpose:** Responsibility does not end with delegation. Delegators must think ahead and bear co-responsibility for systemic failures in the chain.

### 5. Override—Intervention in Existing Responsibility

$$P_{\text{oversteer}}(E) = \lambda \cdot \exp\left(\gamma \cdot \frac{S_E}{S_S}\right) \tag{8}$$

*In prose:* Override is the system's emergency mechanism: an entity intervenes in another's task area upon recognizing that goal achievement is otherwise at risk. This is permitted—but costly.

- The cost of frequent overrides rises exponentially. - Each override reduces $\text{Cap}_{\text{past}}$ long-term.

The cost is shared with the original delegator, discouraging not only authoritarian abuse but also strategic offloading, and promoting cooperation. The overriding entity assumes the overridden entity's responsibility and authorizations as $\text{Cap}_{\text{aktiv}}(E)$ but is penalized upon task completion. An override is only possible if the overriding entity's $\text{Cap}_{\text{potential}}(E)$ suffices for the additional task.

### 6. Penalty for Excessive Complexity (k-Values)

$$\Delta\mathrm{Cap}_{\mathrm{past,penalty,k}}(E) = \omega \cdot \exp\left(\chi \cdot \frac{k_{\mathrm{aktuell}}}{k_{\mathrm{Median}}}\right) \tag{9}$$

*In prose:* Entities undertaking overly complex tasks (high $k_{\mathrm{aktuell}}$) risk a penalty. This prevents responsibility dilution through unnecessary complexity. The exponential term $\exp(\chi \cdot \frac{k_{\mathrm{aktuell}}}{k_{\mathrm{Median}}})$ penalizes tasks whose complexity significantly exceeds the systemic median ($k_{\mathrm{Median}}$), with $\chi$ controlling penalty severity.

- $\omega$: Base penalty scale. - $k_{\mathrm{aktuell}}$: Complexity factor of the current task. - $k_{\mathrm{Median}}$: Median of complexity factors in the system.

**Purpose:** This penalty promotes efficient and responsible task assumption by sanctioning strategic complexity escalation.

### 7. Penalty for Excessive Delegation Depth (D-Values)

$$\Delta\mathrm{Cap}_{\mathrm{past,penalty,D}}(E) = \delta \cdot \exp\left(\rho \cdot \frac{D_{\mathrm{aktuell}}}{D_{\mathrm{hist}}}\right) \tag{10}$$

*In prose:* Entities delegating tasks too deeply (high $D_{\mathrm{aktuell}}$) risk a penalty. This prevents responsibility dilution through excessive delegation chains. The exponential term $\exp(\rho \cdot \frac{D_{\mathrm{aktuell}}}{D_{\mathrm{hist}}})$ penalizes tasks whose delegation depth significantly exceeds the historical norm ($D_{\mathrm{hist}}$), with $\rho$ controlling penalty severity, consistent with the return penalty.

- $\delta$: Base penalty scale. - $D_{\mathrm{aktuell}}$: Current delegation depth of the task. - $D_{\mathrm{hist}}$: Historical delegation depth (median of delegation chains).

**Purpose:** This penalty promotes clear and responsible delegation structures by sanctioning overly deep chains.

**Summary Overview:**

The penalties address various abuse channels to maintain systemic integrity. Table 2 summarizes the penalties and their purposes:

Table 2: Penalties and Abuse Channels

| **Penalty** | **Abuse Channel** | **Type** |
|---|---|---|
| $\Delta\mathrm{Cap}_{\mathrm{past,penalty,return}}$ | Return of own tasks | Exponential |
| $\Delta\mathrm{Cap}_{\mathrm{past,penalty,delegate}}$ | Return by own recipients | Exponential |
| $\Delta\mathrm{Cap}_{\mathrm{past,penalty,k}}$ | Excessive delegation breadth (k-values) | Exponential |
| $\Delta\mathrm{Cap}_{\mathrm{past,penalty,D}}$ | Excessive delegation depth | Exponential |
| $P_{\mathrm{oversteer}}$ | Unauthorized override | Exponential |

- Returns are permitted but diminish reputation. - Overrides save projects but reduce legitimacy. - Complexity and deep delegations are penalized to keep responsibility clear. - Feedback protects the system—especially from persistent manipulation. - The ethical effect of feedback relies on asymmetric weighting:

The weak carry greater weight.

This architecture creates a learning, self-healing system where power is corrected by effect, and responsibility is not a moral option but a structural consequence.

### 5.5 Protective Mechanisms

$\mathrm{Cap}_{\mathrm{protection}}$ is the core of protection for weaker entities. It is dynamically calculated:

$$\mathrm{Cap}_{\mathrm{protection}}(E,t) = \alpha \cdot \frac{1}{\mathrm{Cap}_{\mathrm{past}}(E) + \mathrm{Cap}_{\mathrm{base}}(E)} + \beta \cdot \mathrm{Vulnerability}(E,t) \tag{11}$$

- $\alpha$: Scaling factor for base protection. - $\beta$: Weighting of vulnerability. - $\mathrm{Vulnerability}(E,t)$: Time-dependent measure of protection needs (e.g., resources, experience).

*In prose:* $\mathrm{Cap}_{\mathrm{protection}}$ ensures no entity is overburdened. It acts as a safety net: the weaker the entity, the higher the protection. This prevents exploitation and promotes systemic stability.

# 6 Antispeciesism

$\mathrm{X}^{\infty}$ treats all entities—humans, non-humans, environment—as equivalent. Antispeciesism is embedded in the Cap logic:

- **Equal Basis**: Every entity receives $\mathrm{Cap}_{\mathrm{base}}$ and $\mathrm{Cap}_{\mathrm{BGE}}$.
- **Fairness through Effect**: $\mathrm{Cap}_{\mathrm{potential}}$ is based on responsibility, not species.
- **Feedback for All**: Every entity can provide feedback, regardless of its nature.

*In prose:* Antispeciesism does not mean uniformity but equivalence in effect. A tree, an AI, or a human—each entity bears responsibility according to its capability and is protected by the system.

# 7 Conclusion

$\mathrm{X}^{\infty}$ offers a radical alternative to moral systems. It replaces subjective values with mathematical precision, protects weaker entities through structural mechanisms, and enables fair responsibility distribution without speciesist biases. The system's strength lies in its simplicity and adaptability: it requires no external authority, self-regulating through effect and feedback.

*Note: This document is a working paper presenting the first complete version of the mathematical foundations of the $X^{\infty}$ model. It is intended for public discussion, feedback, and validation. Further detailed chapters will follow. Changes and additions are expressly reserved.*

### 7.1 License