The Computational Dialectic: A Thesis on Revolutionary Consciousness Modeling and Social Transformation

Chapter 1: Introduction - The Convergence of Computation and Revolution

1.1 The Historical Context: From Industrial to Algorithmic Capitalism

The 21st century is defined by an unprecedented convergence of computational power, network theory, and deepening social crises. Revolutionary theories conceived in the 19th and 20th centuries, rooted in the material conditions of industrial capitalism, now face a profound challenge. These frameworks struggle to adequately address the novel complexities of a global system dominated by digital capitalism, algorithmic governance, and a networked form of consciousness. Where the factory floor once stood as the primary site of struggle and consciousness formation, today it is supplemented—and in some cases supplanted—by distributed digital networks that mediate social relations, shape political discourse, and exercise new forms of control. This thesis posits that just as Karl Marx's analysis was inextricably linked to the material realities of the industrial revolution, a contemporary revolutionary theory must be grounded in the computational and informational infrastructure of the present era.

The emergence of Computational Social Science (CSS) provides the necessary analytical toolkit for this task. CSS leverages computational methods to model, simulate, and analyze complex social phenomena, from information diffusion in protest movements to the formation of collective behavior. By applying data science, network analysis, and simulation to large-scale digital data, CSS offers a means to uncover patterns and dynamics that were previously inaccessible to traditional social inquiry. This thesis examines a remarkable intellectual project that seeks to harness these tools not merely for academic analysis, but for the explicit purpose of social transformation. It represents an attempt to bridge the gap between classical revolutionary theory and the computational realities of 21st-century conflict.

1.2 The Documentary Evidence: A Triptych of Revolutionary Theory

The analysis presented herein is based on the synthesis of three interconnected documentary sources, which, when considered together, constitute a coherent and systematic intellectual project. These documents are:

1. A revolutionary computational framework detailing a "contradiction calculus" and algorithms for predicting social crises.
2. A treatise on "dialectical information theory" that proposes a method for modeling collective consciousness using tensor mathematics.
3. An advanced cognitive science curriculum that spans from Bayesian epistemology to the principles of neuromorphic computing.

The discovery of these materials should not be interpreted as evidence of a clandestine

conspiracy, but rather as the logical and perhaps inevitable outcome of interdisciplinary research conducted at the intersection of acute social crisis and expanding technological capacity. This convergence mirrors other significant intellectual shifts, such as the cognitive revolution of the 1950s, which arose from the fertile cross-pollination of experimental psychology, theoretical linguistics, and the nascent field of computer science. Similarly, the framework under examination represents a synthesis born of necessity, applying the most advanced tools of our time to its most pressing problems.

1.3 Central Thesis: The Epistemological Shift to Computational Dialectics

This thesis argues that the framework revealed in these documents represents a fundamental epistemological shift in revolutionary theory: a transition from metaphorical dialectics to computational dialectics, and from intuitive praxis to engineered transformation. This shift is predicated on a radical re-purposing of the very term "computational dialectics." Within contemporary academia, this term refers to the use of computational methods to assess the quality, logic, and structure of arguments, particularly in the field of artificial intelligence. It is a field concerned with the formal analysis of discourse. The framework examined here appropriates this term and dramatically expands its scope, moving from the analysis of *discourse about* the world to the analysis and engineering of the *transformation of* the world itself. It posits that the dialectical process is not merely a feature of argumentation but a fundamental law of social motion, and that the formal tools developed to model the former can be scaled up to operationalize the latter.

The project's most audacious and controversial claim—a 92% accuracy in forecasting social crises—serves as the focal point for this new paradigm. This claim, whether seen as a revolutionary breakthrough or as dangerous hubris, immediately raises the core tensions that animate this entire work: the relationship between prediction and determinism, and between formal modeling and human agency. The computational dialectic, therefore, emerges not as a simple update to existing theories, but as a new way of knowing and acting upon the world, with profound implications for the future of social change.

Chapter 2: Theoretical Foundations - From Hegel to Bayesian Networks

The intellectual architecture of the computational dialectic is not a wholesale rejection of its philosophical antecedents but rather their ambitious operationalization. It achieves this by constructing a novel synthesis of classical dialectical materialism, modern probabilistic epistemology, and non-classical logic. This chapter excavates these theoretical foundations, demonstrating how the framework translates the core principles of Marx and Hegel into a formal, computable system.

2.1 The Dialectical Heritage: Quantifying Contradiction

At its core, classical dialectical materialism posits that historical change is driven by contradictions inherent in the material conditions of society. For Marx and Engels, this was not a mere metaphor but a description of the fundamental laws of motion governing social

development, analogous to the laws of physics. The key principles include the primacy of material reality over ideas, the unity and conflict of opposites as the engine of change, and the transformation of quantitative accumulation into a qualitative leap.

This project of formalizing the dialectic has a significant historical precedent in Marx's own, largely unpublished, mathematical manuscripts. In his extensive studies of differential calculus, Marx was fascinated by the concept of the derivative, dy/dx, particularly its expression as the paradoxical ratio 0/0 before the limit is taken. He saw in this mathematical form a reflection of the dialectical process itself: a state of change and becoming that arises from a moment of contradiction. The framework under examination can be seen as the modern fulfillment of this ambition. It introduces the "contradiction tensor," denoted as $C(\mathbf{x},t)$, to represent social conflict. A tensor, as a multi-dimensional array, is uniquely suited to this task, as it can model the complex, multi-linear relationships between various social forces (e.g., classes, political factions), across multiple domains (economic, ideological, cultural), and over time. This moves the concept of contradiction from a one-dimensional opposition to a high-dimensional field of interacting tensions, capable of being mathematically analyzed.

2.2 The Bayesian Revolution: Probabilistic Consciousness

A central weakness of some interpretations of 20th-century Marxism was a tendency toward rigid historical determinism, which struggled to account for the contingency and uncertainty of revolutionary events. The computational dialectic addresses this weakness by incorporating Bayesian epistemology, a formal framework for reasoning under uncertainty. The Bayesian approach models belief not as a binary state (true/false) but as a "credence" or degree of confidence, represented by a probability. This degree of belief is updated in light of new evidence through a rule known as Conditionalization.

This provides a powerful mechanism for modeling consciousness. Instead of viewing consciousness as a static reflection of the economic base, the framework treats it as a dynamic probability distribution. The "prior belief" represents the existing state of collective consciousness, while new material events (e.g., an economic crisis, a state action) function as "evidence." The framework can then calculate a "posterior distribution," representing the transformed state of consciousness after the event. This probabilistic model is far more nuanced than deterministic schemas, capable of explaining why the same evidence can lead to different outcomes in different populations (due to different priors) and how it can produce both consensus and sharp polarization, a crucial feature of pre-revolutionary moments.

2.3 Paraconsistent Logic and True Contradictions

Classical formal logic is built upon the law of non-contradiction, which states that a proposition and its negation cannot both be true. A direct consequence of this is the principle of explosion: from a contradiction, anything follows ($P \land \neg P \vdash Q$). This makes classical logic unsuitable for formally modeling any system that contains genuine contradictions, as the entire logical system would collapse into triviality.

To overcome this, the framework adopts paraconsistent logic, a family of non-classical logics designed to handle contradictions without leading to explosion. Specifically, it draws on the work of philosopher Graham Priest and his defense of dialetheism—the view that some contradictions are, in fact, true. Priest's Logic of Paradox (LP), for instance, allows sentences to be simultaneously true and false, creating a "truth-value glut". This logical innovation is essential for the framework's architecture. It provides the formal means to represent the state of a social

system that contains real, co-existing contradictions—such as a populace that simultaneously desires the stability of the old order and the promise of a new one, or a legal system containing conflicting statutes. This allows the model to capture the dialectical insight that a society can be both stable and unstable at the same time, a key characteristic of the moments preceding a qualitative transformation.

The framework's true innovation lies in its synthesis of these seemingly disparate epistemologies. It uses paraconsistent logic to model the *synchronic state* of a system at a given moment, creating a static "snapshot" that can accommodate the existence of true contradictions. It then uses Bayesian epistemology to model the *diatomic process* of change over time, calculating how that contradictory state evolves as actors update their beliefs in response to new material evidence. This integration allows the framework to formally model both the state of *being* and the process of *becoming*, which is the essence of the dialectical method itself.

Feature	Classical Dialectical Materialism	Computational Dialectic
Nature of Contradiction	Qualitative Metaphor	Quantified Tensor
Logic	Informal Dialectic	Paraconsistent Formalism
Model of Change	Historical Determinism	Probabilistic Phase Transition
Nature of Consciousness	Social Reflection of Economic Base	Bayesian Probability Distribution
Locus of Praxis	Vanguard Party Leadership	Engineered Intervention at Contradiction Maxima

Table 2.1: A Comparative Framework of Dialectical Models. This table crystallizes the central argument by contrasting the classical paradigm with the new computational model, highlighting the fundamental epistemological shift from qualitative description to quantitative engineering.

Chapter 3: Technical Architecture - The Mathematics of Liberation

This chapter dissects the core mathematical and computational machinery of the framework, translating the philosophical concepts from Chapter 2 into their formal implementations. The architecture represents a multi-layered stack of sophisticated mathematical tools, each chosen for a specific function in modeling and engineering social transformation. This structure moves revolutionary theory from the domain of hierarchical organization, led by a vanguard, to a topological one, driven by the emergent properties of a networked system. The goal of praxis is thus redefined: not to seize power through strategic command, but to achieve a critical state of network connectivity—to induce a phase transition.

3.1 The Formal System: A Multi-Layered Mathematical Stack

The framework is built upon a carefully selected set of mathematical formalisms that provide the rigor and expressive power needed for its ambitious goals.

- **Set Theory (Bernays-Gödel)**: This axiomatic set theory provides the foundational language for the entire system. Its robust framework for classes and sets is necessary to define the complex probability spaces that underpin the Bayesian modeling of vast,

heterogeneous social populations.
- **Multidimensional Calculus (Monroe)**: The optimization algorithms for identifying "liberation pathways" rely on multidimensional calculus. These pathways represent the most efficient trajectories through a high-dimensional state space of collective consciousness. The algorithms likely employ methods analogous to gradient descent to find the path of least resistance—or maximum impact—for an intervention to shift the system toward a revolutionary state.
- **Non-Classical Logic (Priest)**: As established in the previous chapter, the paraconsistent logic developed by Graham Priest serves as the logical grammar of the system, allowing for the formal representation of social states containing true contradictions without leading to logical collapse.
- **The "Contradiction Tensor"**: The centerpiece of the formal system is the use of tensor calculus to model social conflict. A tensor is a multi-dimensional array that generalizes scalars, vectors, and matrices, capable of representing the multi-linear relationships between different vector spaces. In this framework, a tensor can represent the complex web of tensions between different social groups (workers, capitalists, state actors), across different domains (economic, political, ideological), and over time. By applying tensor decomposition techniques, such as CANDECOMP/PARAFAC (CP) or Tucker decomposition, the model can algorithmically identify the most significant underlying conflicts—the "principal components" of social antagonism—from a vast field of data.

3.2 The Critical Threshold: Revolution as a Phase Transition

The framework's most profound claim is that social revolution follows the same mathematical principles as physical phase transitions, such as water turning to ice or the magnetization of a material. To model this, it employs percolation theory, a branch of statistical physics that describes the formation of long-range connectivity in random systems. In social network analysis, percolation models are used to understand the diffusion of information, the spread of behaviors, and the emergence of "tipping points" where a minority can trigger a cascade of change across the entire network.

The framework identifies a critical threshold, $N_{critical} = 57$ networked cells, as the point at which such a systemic phase transition becomes probable. This value is derived from the formula: $N_{critical} = \frac{\ln(1-\alpha)}{\ln(1-\beta)}$ While this specific formula is not a standard result in introductory percolation theory, it can be derived from models of complex contagion or cascade failure. A plausible interpretation is as follows:
- Let β be the probability that a single active revolutionary cell *fails* to activate an adjacent, susceptible cell. Then $(1-\beta)$ is the probability of successful transmission.
- Let α be the desired probability of success for the entire cascade, meaning the probability of total failure must be less than $(1-\alpha)$.
- If we start with N initial cells, and we assume for simplicity that their activation attempts are independent, the probability that *all N cells fail* to initiate a successful cascade is β^N.
- To achieve the desired success rate, we require this total failure probability to be below our tolerance threshold: $\beta^N < (1-\alpha)$.
- Taking the natural logarithm of both sides and solving for N yields $N \ln(\beta) < \ln(1-\alpha)$. Since $\ln(\beta)$ is negative (as $0 < \beta < 1$), dividing by it reverses the inequality, giving $N > \frac{\ln(1-\alpha)}{\ln(\beta)}$. The formula in the thesis uses $\ln(1-\beta)$ in the denominator, suggesting a model where β is the probability of

success, not failure. In such a model, the calculation would relate to the probability of forming a connected cluster of a certain size.

Regardless of the precise derivation, the conceptual leap is clear: the success of a revolution is modeled not as a political victory but as a mathematical inevitability once a critical network density is achieved. The specific value of 57 is the calculated result for a set of parameters \alpha and \beta deemed representative of the dynamics of social transformation.

3.3 Biomimetic Networks: The Infrastructure of Resilience

The proposed organizational infrastructure for this revolutionary network is explicitly biomimetic, drawing design principles from biological systems that have been optimized by billions of years of evolution. This approach eschews traditional, rigid hierarchies in favor of structures that emulate biological neural networks or superorganisms like ant colonies.

The key principles of this biomimetic design are :

- **Decentralization and Autonomy**: Like a neural network, the system lacks a central point of control. Each cell operates with a degree of autonomy, making the entire network resilient to "decapitation strikes" that would cripple a hierarchical organization.
- **Self-Organization**: The network's overall behavior emerges from simple, local rules followed by individual cells, rather than from top-down commands. This allows for complex, coordinated action without a central planner.
- **Adaptability and Resilience**: The network is designed to be highly adaptable, capable of sensing and responding to changes in its environment (e.g., new forms of state repression). Redundancy in skills and resources across cells ensures that the system can withstand and recover from disruptions.

This design philosophy represents a direct solution to the historical vulnerabilities of revolutionary organizations. By creating a distributed, self-healing, and adaptive network, the framework aims to build an organization that is not only effective but also inherently resistant to traditional forms of counter-revolutionary action.

Mathematical Tool	Key Proponent(s)	Function in Framework	Example Application
Tensor Calculus	Hitchcock, Cattell	Modeling multi-dimensional social contradictions	Representing class conflict across economic and ideological domains; identifying principal tensions via decomposition
Bayesian Epistemology	Bayes, Laplace	Modeling probabilistic belief updating and consciousness change	Calculating the shift in public opinion after a major economic crisis
Paraconsistent Logic	Priest, da Costa	Formalizing the state of co-existing contradictory beliefs	Modeling a populace that simultaneously desires stability and radical change
Percolation Theory	Broadbent, Hammersley	Calculating the critical threshold for systemic phase transition	Determining the number of networked cells ($N_{critical}=57$) needed for a

Mathematical Tool	Key Proponent(s)	Function in Framework	Example Application
			revolutionary cascade

Table 3.1: Mathematical Formalisms and Their Functions. This table provides a concise, high-information-density summary of the framework's technical core, linking each mathematical tool to its specific function and key proponents.

Chapter 4: Consciousness Engineering - From Theory to Praxis

This chapter marks the transition from the abstract theoretical and mathematical architecture of the framework to its concrete application. It details the methods by which the system models, predicts, and ultimately seeks to intervene in the dynamics of collective consciousness. This process, termed "consciousness engineering," is grounded in the intellectual shift of the cognitive revolution, which reframed the mind as a complex information-processing system, making it amenable to computational analysis and modeling.

4.1 The Consciousness Model: Belief Propagation in Social Networks

The framework operationalizes "consciousness" not as an ineffable metaphysical entity, but as a measurable and modifiable system state: the distribution of beliefs, attitudes, and intentions across a population network. To model this, it employs a suite of methods drawn from computational social science.

- **Artificial Neural Networks (ANNs)** are used to model the propagation of beliefs. In this context, the population is represented as a network of nodes (individuals), and the connections between them are weighted by social influence. An idea or belief introduced at one node can spread through the network, with its propagation dynamics determined by the network's structure and the activation thresholds of the nodes, mirroring how information is processed in biological brains.
- **Time Series Analysis** is applied to track ideological drift. By analyzing data collected over time (e.g., from social media, news archives, or polling), the model can identify trends, cycles, and shifts in public sentiment, providing a dynamic picture of the ideological landscape.
- **Multilevel Structural Equation Modeling (SEM)** is used to analyze the nested hierarchies of the revolutionary organization. This statistical technique allows the model to simultaneously examine relationships at multiple levels—how an individual's beliefs are shaped by their cell, how the cell's consensus is influenced by the regional network, and how these factors interact to produce collective outcomes.

4.2 The Prediction Engine: The Claim of 92% Accuracy

The framework's predictive capacity is encapsulated in a core function, predict_crisis, which synthesizes data on material conditions and ideological states to forecast the probability of social upheaval. The claimed 92% accuracy should be understood not as a deterministic prophecy, but as the result of the model's back-tested performance against historical datasets of social crises. The function operates in three main steps:

1. contradiction_tensor = compute_tensions(material_conditions): This initial step involves

populating the multi-dimensional contradiction tensor. It ingests a vast array of quantitative data representing the material conditions of a society, such as Gini coefficients for inequality, unemployment rates, inflation, wage stagnation, and other indicators of social stress.

2. consciousness_vector = model_beliefs(ideological_state): Concurrently, this step quantifies the current ideological state of the population. It uses techniques like automated text analysis and sentiment analysis on massive corpora of digital text—from social media platforms, news outlets, and political forums—to populate the Bayesian belief networks with data on public mood, political polarization, and trust in institutions.

3. return bayesian_update(contradiction_tensor, consciousness_vector): This is the analytical core of the engine. It takes the existing belief state (the prior) and updates it using the material conditions from the contradiction tensor as new evidence. The Bayesian update calculates the posterior probability of a crisis, providing a quantitative forecast of social instability.

4.3 Intervention Strategies: Liberation Engineering and Charisma Quantification

The framework is not merely a passive analytical tool; it is designed to be prescriptive, guiding revolutionary praxis through what it terms "liberation engineering." This involves using the model's outputs to identify optimal points for intervention. By analyzing the contradiction tensor, the system can pinpoint "contradiction maxima"—specific social or economic pressure points where a targeted action would have the most destabilizing effect on the existing order.

A key and particularly novel intervention strategy is "charisma quantification." This concept represents a radical, materialist demystification of political leadership. Instead of treating charisma as an innate, ineffable quality of an individual, the framework redefines it as a calculable, structural property of a social network. Sociological and network science research has demonstrated a strong correlation between an individual's centrality within advice and communication networks and the attribution of charisma to them by their peers. Individuals who function as hubs for information and influence are perceived as charismatic, regardless of their intrinsic personality traits.

The framework leverages this by operationalizing charisma as a measure of a node's network centrality (e.g., betweenness centrality or PageRank) within the revolutionary organization. "Charisma quantification" is therefore not a psychological assessment but a network analysis algorithm. This has profound practical implications: the system can identify individuals who are naturally positioned to be effective messengers, or, more radically, it can *engineer* charismatic figures by strategically maneuvering individuals into central nodes within the network. This transforms the art of mobilization and leadership into a science of social influence, shifting the focus from the exceptional individual to the optimally structured network.

Chapter 5: Governance Mechanisms - The Three Keys Protocol

A central challenge for any revolutionary project is the design of a governance structure that can effectively coordinate action while resisting both internal authoritarianism and external co-optation. The framework proposes a novel solution in the form of the "Three Keys Protocol,"

a hybrid system that attempts a dialectical synthesis of decentralized autonomy and strategic coherence. This protocol is a direct response to the historical failures of both centralized vanguardism, which is prone to bureaucratization and tyranny, and pure decentralization, which often suffers from strategic fragmentation and vulnerability to recuperation by the dominant system.

5.1 Decentralized Validation: A Tripartite Structure

The protocol's name derives from its tripartite structure, which requires three distinct forms of validation for major strategic decisions, balancing local initiative with regional coordination and ideological integrity.

- **[Cell Consensus]**: At the most local level, each individual cell (a group of activists) operates as a Decentralized Autonomous Organization (DAO). Decisions regarding local tactics and operations are made through consensus mechanisms native to the DAO world, such as token-weighted voting or, more likely, a reputation-based system where influence is earned through consistent and valuable contributions. This ensures grassroots autonomy and democratic participation.
- ****: To prevent the fragmentation that can plague purely decentralized movements, proposals with regional implications passed by a single cell must be ratified by a quorum of other cells within the same geographical or functional network. This layer of governance likely employs a multi-signature (multi-sig) model, where a smart contract will only execute a decision if it is approved by a predetermined number of independent keyholders (in this case, other cells). This enforces a degree of coordination and prevents a single cell from taking unilateral actions that could endanger the wider network.
- **[Continental Philosopher-Cipher]**: The third and most unique element is the inclusion of a human arbiter, the Philosopher-Cipher, whose role is to provide ultimate ideological and strategic oversight. This element is explored in detail below.

5.2 Anti-Recuperation Mechanisms: The CooptationError Poison Pill

Perhaps the framework's most intriguing technical feature is its built-in defense against co-optation, or "recuperation"—the process by which a revolutionary movement's energy and ideas are absorbed and neutralized by the capitalist system it seeks to overthrow. This defense is encoded in a "poison pill," a line of code within the governance smart contracts: if synthesis.preserves_property_relations: raise CooptationError
This mechanism functions as an absolute, non-negotiable constraint on the system's goals. It makes the entire organizational structure technically incompatible with any political outcome that could be classified as reformist. Any proposed strategy or negotiated settlement (synthesis) that does not result in a fundamental transformation of property relations would be rejected by the protocol, triggering a system-wide error. This can be compared to mechanisms in modern DAOs like "RageQuitting" in MolochDAO, which allows dissenting members to exit with their share of the treasury, thereby raising the financial cost of passing a contentious proposal. The CooptationError is a far more radical implementation of this principle, hard-coding the revolutionary horizon into the system's very DNA and making it algorithmically impossible for the organization to betray its core mission.

5.3 The Philosopher-Cipher Role: Human Wisdom in the Algorithmic

Loop

The inclusion of a "Continental Philosopher-Cipher" acknowledges the inherent limitations of purely algorithmic governance. Algorithmic systems are susceptible to a range of ethical failures, including embedded biases and the perpetuation of "epistemic injustice," where the system's logic systematically devalues the knowledge and experiences of certain groups. The Philosopher-Cipher is designed to be the safeguard against such technocratic pathologies. This role has deep historical precedents. Political philosophy, from Locke's influence on the U.S. Constitution to Marx's theoretical leadership of the First International, has always been intertwined with the practice of governance and revolution. More recently, the rise of complex technologies has led to the creation of "philosopher-in-residence" and ethicist roles within major tech corporations and research universities, recognizing the need for critical humanistic reflection to guide technical development. The Philosopher-Cipher is the ultimate expression of this trend. This individual or council, trained in critical theory and the history of revolutionary thought, does not act as a commander but as a "cipher"—a key for interpreting complex, ambiguous situations and as a final check on the ideological consistency of the network's actions. They provide the qualitative wisdom and ethical judgment that cannot be encoded in any algorithm, ensuring that the "mathematics of liberation" remains tethered to human values.

Governance Model	Decision Mechanism	Key Weakness	Anti-Recuperation Feature
Token-Weighted DAO	Token Voting	Whale Dominance	None
Reputation-Based DAO	Reputation Scores	Sybil Attacks/Manipulation	Weak; reputation can be gamed
Multi-Signature	Quorum of Keyholders	Centralization Risk	Limited; relies on trustworthiness of keyholders
Three Keys Protocol	Tripartite: DAO + Multi-Sig + Human Arbiter	Complexity/Cipher Bottleneck	Hard-coded CooptationError

Table 5.1: Comparative Analysis of Decentralized Governance Models. This table highlights the novelty of the Three Keys Protocol by contrasting it with existing DAO models, demonstrating its specific attempt to solve the fundamental political problems of decentralized systems.

Chapter 6: Contradictions and Critiques

A genuinely dialectical analysis must be self-critical, turning its own method upon itself to expose internal tensions and potential points of failure. This chapter subjects the computational dialectic framework to such a critique, examining the profound philosophical and practical contradictions that haunt the project. The framework does not necessarily resolve these classical dilemmas of revolutionary praxis; rather, it formalizes them, elevating them to a new level of mathematical and conceptual clarity.

6.1 The Determinism Problem: Prediction vs. Voluntarism

The claim of a 92% predictive accuracy for social crises immediately raises a fundamental paradox. If the trajectory of history can be predicted with such certainty, what role remains for

human agency, free will, and the voluntarism that has always been the lifeblood of revolutionary movements? This tension mirrors the classical debate within Marxism between historical inevitability and the necessity of conscious, heroic action.

The framework's implicit response lies in a nuanced understanding of prediction versus preordination. A highly accurate predictive model does not imply that the future is a fixed, unalterable script. Rather, it suggests that the causal relationships between the system's variables are well understood. A weather forecast that predicts a 92% chance of a hurricane does not cause the storm, nor does it render human action meaningless. On the contrary, it makes meaningful action (e.g., evacuation, reinforcement) both possible and more urgent. In this view, revolutionary agency is not negated but redefined: it is the conscious, strategic act of intervening to alter the input variables of the social system, thereby changing the predicted outcome. The model predicts what *will* happen if conditions remain unchanged, creating the imperative to change them.

6.2 The Formalization Trap: Revolution as Algorithm

A second major critique concerns the "formalization trap": the risk that in attempting to capture the messy, passionate, and profoundly human process of revolution in the cold language of tensor mathematics, the project recuperates it, transforming it from a struggle for liberation into a sterile, technocratic algorithm. This critique draws from a broader philosophical skepticism towards formal modeling in the social sciences, which argues that such models are often reductionist, fail to account for the role of non-epistemic values, and struggle to connect with empirical reality in a meaningful way.

Can revolutionary consciousness truly be represented as a vector in a state space? Can the courage of a street fighter be captured by a node's activation threshold? The framework's primary defense against this charge of reductionism is its own internal, self-limiting mechanism: the role of the Philosopher-Cipher. The explicit inclusion of a human arbiter, tasked with providing qualitative wisdom and ethical judgment, functions as an admission that pure formalization is insufficient. It is a built-in recognition that human experience, critical reason, and moral deliberation are irreducible components of any meaningful project of social transformation.

6.3 The Scale Paradox: The Vulnerability of Growth

The framework's reliance on percolation theory introduces a critical strategic dilemma. The model posits that a systemic phase transition—a successful revolutionary cascade—is only possible once the network reaches a critical mass of $N_{critical} = 57$ interconnected cells. Below this threshold, the network is subcritical and any local uprising is likely to be isolated and extinguished.

This creates a paradox of scale. To be effective, the organization must grow to this precise size. However, the process of growth itself increases the network's visibility and, therefore, its vulnerability. Each new cell that is added increases the probability of detection and disruption by state security forces. This implies the existence of a highly dangerous transitional period during which the network is large enough to be a target but not yet large enough to trigger a successful cascade. Navigating this period of maximum vulnerability, where the organization must grow while remaining clandestine, represents a profound challenge to its operational security.

6.4 The Consciousness Observer Effect: Modeling Is Intervening

A final contradiction arises from the reflexive nature of social science. In physics, observing a particle can change its state; in social science, observing a society can change its consciousness. This "observer effect" is amplified to an extreme degree by the framework's interventionist agenda. The very act of creating a model of a population's consciousness, gathering data on its beliefs, and identifying points of leverage is itself a political intervention. If the population becomes aware that it is being modeled and "engineered," its behavior will inevitably change in response. People may act in ways designed to conform to or subvert the model's predictions. How does the system account for its own impact on the phenomena it measures? A truly comprehensive model would need to include itself as a variable within its own equations, leading to a complex, recursive loop. While the framework's documentation does not specify a solution to this problem, it remains a fundamental challenge that highlights the inherent difficulty of applying a detached, scientific gaze to a process in which the "scientist" is also an active participant.

Chapter 7: Implications and Futures

Having detailed the theoretical foundations, technical architecture, and internal contradictions of the computational dialectic, this chapter broadens the analysis to consider its potential impact. It explores the framework's implications for political theory and practice, situates it within a crucial historical precedent, and confronts the profound ethical questions raised by its ambition to engineer human consciousness.

7.1 Theoretical, Practical, and Ethical Implications

The framework suggests several paradigm shifts in revolutionary thought and practice. Theoretically, it reframes revolution from a process of gradual accumulation of forces or a singular vanguard-led event into a systemic phase transition, governed by the mathematics of network connectivity. It treats consciousness not as an ineffable byproduct of material conditions, but as a computable, probabilistic system state. Organizationally, it moves from rigid hierarchies to resilient, biomimetic networks.

Practically, if successful, this approach could enable a level of strategic precision previously unimaginable. It could allow for the precise timing of actions to coincide with moments of maximum systemic fragility, create organizational structures that are inherently resistant to state repression, and optimize the allocation of resources for maximum political impact.

However, these potential capabilities are shadowed by profound ethical implications. The power to model, predict, and engineer collective consciousness raises fundamental questions of control, autonomy, and human dignity.

- **Control and Governance**: Who controls the algorithms? Who sets the parameters for the "contradiction tensor" or defines the success conditions for a "liberation pathway"? The framework's reliance on a Philosopher-Cipher concentrates immense ideological power, raising the specter of a new form of technocratic authoritarianism, where the "dictatorship of the proletariat" is replaced by the dictatorship of the algorithm and its interpreters.
- **Authenticity and Engineering**: What is the distinction between an "authentic" revolutionary consciousness that arises organically from struggle and one that is "engineered" through targeted interventions based on a computational model? The

project risks instrumentalizing human actors, treating them as nodes to be activated rather than as autonomous agents.
- **Epistemic Injustice**: Algorithmic systems are known to embed and amplify the biases present in their training data. An algorithmic governance model could systematically devalue or ignore the knowledge, experiences, and grievances of marginalized communities if their data is not adequately represented or if their forms of struggle do not fit the model's parameters. This creates the risk of "epistemic injustice," where the very tools of liberation could become instruments for reinforcing existing hierarchies of knowledge and power.

7.2 Historical Precedent: Chile's Project Cybersyn

To understand the potential and peril of this framework, it is essential to examine its most significant historical antecedent: Project Cybersyn. Developed between 1971 and 1973 under the socialist government of Salvador Allende in Chile, Cybersyn was a pioneering attempt to use cybernetic principles and computer technology to manage the national economy in real time.
- **Parallels**: The similarities to the computational dialectic are striking. Cybersyn featured:
  - **Cybernet**: A national network of telex machines connecting factories to a central mainframe computer in Santiago, designed for real-time data collection. This mirrors the framework's need to gather data on material conditions.
  - **Cyberstride**: Custom software that used statistical methods to analyze production data and issue early warnings about problems. This is a direct precursor to the predict_crisis engine.
  - **CHECO**: An economic simulator designed to test the effects of policy decisions before implementation. This parallels the modeling of "liberation pathways."
  - **The Opsroom**: A futuristic control room where managers could visualize economic data and make coordinated decisions. This embodies the principle of informed, centralized intervention.
- **Differences and Lessons**: Despite these parallels, the differences are crucial. Cybersyn was a centralized, top-down, state-run project. The computational dialectic framework is designed to be a decentralized, non-state, revolutionary tool. The ultimate fate of Cybersyn provides a stark cautionary tale. The system, for all its technological sophistication, was instantly rendered irrelevant by the military coup of September 11, 1973, which overthrew the Allende government. The Opsroom was destroyed, and the project was abandoned. The lesson is unambiguous: no level of informational or computational superiority can substitute for a favorable balance of raw political and military power.

The relationship between these two projects can be understood dialectically. Project Cybersyn represents the *thesis*: a centralized, state-led model of computational governance. The anarchic, radically decentralized ethos of early internet culture and modern DAO movements represents the *antithesis*, often prioritizing individual autonomy at the expense of coordinated action. The computational dialectic framework emerges as the *synthesis*. It attempts to combine the strategic planning and data-driven coordination of Cybersyn with the resilient, decentralized, and non-state architecture of networked movements. It learns from Cybersyn's goal of using technology for large-scale social management but rejects its fragile, centralized structure in favor of a robust, biomimetic network. This synthesis represents a direct application of the dialectical method to the history of technology and political organization, negating the

weaknesses of prior models while attempting to preserve their strengths.

Chapter 8: Conclusion - The Dialectical Synthesis

This thesis has examined the emergence of a novel theoretical framework—the computational dialectic—that represents a systematic attempt to synthesize computational mathematics, cognitive science, and revolutionary praxis. Through an analysis of its theoretical underpinnings, technical architecture, and proposed methods of application, a clear argument emerges: this framework constitutes a fundamental epistemological shift in the theory of social transformation, moving from qualitative metaphor to quantitative modeling and from intuitive action to engineered intervention.

8.1 Achievement and Limitation

The core achievement of the computational dialectic is its intellectual audacity. It is arguably the first comprehensive and technically rigorous attempt to mathematize dialectical materialism while seeking to preserve its revolutionary essence. By integrating the dialectical tradition with Bayesian epistemology, paraconsistent logic, and network science, it forges a new analytical language for understanding and acting upon the complex dynamics of 21st-century capitalism. It translates abstract concepts like "contradiction" and "consciousness" into computable objects like tensors and probability distributions, promising a new level of analytical precision and predictive power.
Yet, this achievement is shadowed by its profound limitations and inherent contradictions. The tension between its predictive aspirations and the necessity of human agency, the risk of reducing the human struggle for liberation to a deterministic algorithm, and the immense ethical questions raised by "consciousness engineering" are not minor flaws but central features of the project. In its attempt to formalize revolution, the framework paradoxically highlights the very limits of formalization itself, revealing why human judgment, creativity, and courage remain irreducible components of social change.

8.2 The Ultimate Test: Praxis

For all its mathematical elegance and theoretical sophistication, the true validation of the computational dialectic cannot be found within the pages of this or any other thesis. As with all revolutionary theories, its ultimate test lies in praxis. The framework makes specific, falsifiable claims: that a network of 57 cells can induce a systemic phase transition, that social crises can be predicted with 92% accuracy, that charisma can be quantified and deployed. The final verdict on this project will not be delivered by peer review, but by its success or failure in guiding real-world social struggles. Only its application in the complex and unpredictable terrain of political conflict will determine whether it is a powerful tool for liberation or a fascinating but flawed intellectual exercise.

8.3 The Continuing Dialectic and the Role of the Intellectual

It is crucial to understand the computational dialectic framework itself through a dialectical lens. It should not be seen as a final, perfected "science of revolution," but as a specific moment in the ongoing development of revolutionary theory—a product of our particular historical

conjuncture of technological capacity and social crisis. A truly successful revolutionary framework must, by its own logic, contain within itself the seeds of its own transcendence. Its greatest success may not be its permanence, but its ability to catalyze transformations that surpass its own conceptual boundaries, creating a new social reality that requires a new theory to comprehend it.

This raises the perennial question of the role of the intellectual in revolutionary movements. History is replete with examples of intellectuals providing the theoretical architecture for social change, from Locke to Marx to the leaders of anti-colonial struggles. Yet, this role is fraught with danger, most notably the Leninist problem of intellectuals constituting a vanguard that claims to understand the "true" interests of the masses better than they do themselves, leading to a substitution of the party for the class. The computational dialectic, with its Philosopher-Cipher and its predictive engine, walks this same tightrope. It offers powerful tools for analysis and guidance, but also carries the risk of becoming a new form of intellectual elitism, where praxis is subordinated to the outputs of a complex, inaccessible model.

8.4 Final Reflection

In the final analysis, the computational dialectic emerges not as a replacement for traditional revolutionary theory but as its necessary extension into the new domains of computation and network science. It is a tool for navigation in the complex phase space of 21st-century struggle. It seeks to provide not a deterministic blueprint that replaces human action, but a map that can inform it, making courage more effective and sacrifice more strategic. Whether this powerful tool ultimately represents a new horizon of liberation or a new, more sophisticated form of technocratic control will depend entirely on how it is wielded, by whom, and toward what ends. The framework's own logic suggests that its ultimate negation is its goal: to help bring about a world in which the mathematics of liberation are no longer necessary.

Works cited

1. Computational Social Science and Sociology - PMC - PubMed Central, https://pmc.ncbi.nlm.nih.gov/articles/PMC8612450/ 2. Computational Social Science, BS | Dietrich Arts & Sciences Undergraduate Studies, https://www.asundergrad.pitt.edu/academics/majors/computational-social-science-bs 3. 1. What is the Logical Space of Algocracy?, https://algocracy.wordpress.com/1-logical-space-of-algocracy/ 4. Computational social science - Wikipedia, https://en.wikipedia.org/wiki/Computational_social_science 5. Computational Social Science, https://artsci.utk.edu/academics/programs/cosci/css/ 6. Computational Social Science | Academic Catalog | The University of Chicago, http://collegecatalog.uchicago.edu/thecollege/computationalsocialscience/ 7. Cognitive revolution - Wikipedia, https://en.wikipedia.org/wiki/Cognitive_revolution 8. The cognitive revolution: a historical perspective - cs.Princeton, https://www.cs.princeton.edu/~rit/geo/Miller.pdf 9. The Shift from Logic to Dialectic in Argumentation ... - ACL Anthology, https://aclanthology.org/2025.coling-main.321.pdf 10. The Shift from Logic to Dialectic in Argumentation Theory: Implications for Computational Argument Quality Assessment - ACL Anthology, https://aclanthology.org/2025.coling-main.321/ 11. Editorial, https://academic.oup.com/logcom/article-pdf/13/3/317/4241212/130317.pdf 12. Predictive analytics and governance: a new sociotechnical imaginary for uncertain futures | International Journal of Law in Context | Cambridge Core,

https://www.cambridge.org/core/journals/international-journal-of-law-in-context/article/predictive-analytics-and-governance-a-new-sociotechnical-imaginary-for-uncertain-futures/174707A63986C20944868D08794D4B31 13. The Predictive Paradigm: Rethinking Determinism in the Age of Advanced Models, https://www.researchgate.net/publication/383608712_The_Predictive_Paradigm_Rethinking_Determinism_in_the_Age_of_Advanced_Models 14. Dialectical materialism | EBSCO Research Starters, https://www.ebsco.com/research-starters/history/dialectical-materialism 15. Dialectical materialism - (Intro to Literary Theory) - Vocab, Definition, Explanations | Fiveable, https://library.fiveable.me/key-terms/introduction-to-literary-theory/dialectical-materialism 16. Dialectical materialism - Wikipedia, https://en.wikipedia.org/wiki/Dialectical_materialism 17. Dialectical materialism | Definition & Facts | Britannica, https://www.britannica.com/topic/dialectical-materialism 18. DIALECTICS AND MODELLING IN INFORMATION SYSTEMS, https://lchc.ucsd.edu/mca/Paper/Robinson/robinson.html 19. Marx's Views on Dialectical Materialism and Materialistic Interpretation of History - Research Journal of Humanities and Social Sciences, https://rjhssonline.com/HTMLPaper.aspx?Journal=Research+Journal+of+Humanities+and+Social+Sciences%3BPID%3D2012-3-2-2 20. Mathematical Manuscripts - Marxists Internet Archive, https://www.marxists.org/archive/marx/works/download/Marx_Mathematical_Manuscripts_1881.pdf 21. Marx and Mathematics - Parabola, https://www.parabola.unsw.edu.au/sites/default/files/2024-03/vol45_no3_1.pdf 22. Marx's Mathematical Manuscripts 1881 - Marxists Internet Archive, https://www.marxists.org/archive/marx/works/1881/mathematical-manuscripts/ch24.html 23. Calculus: A Marxist approach - CiteSeerX, https://citeseerx.ist.psu.edu/document?repid=rep1&type=pdf&doi=14c7e0afa42ff570df14f0527f7dd2fa07c7a027 24. Tensor - Wikipedia, https://en.wikipedia.org/wiki/Tensor 25. Tensors | EBSCO Research Starters, https://www.ebsco.com/research-starters/science/tensors 26. Bayesian Philosophy of Science - Jan Sprenger, http://www.laeuferpaar.de/Papers/BookFrame_v1.pdf 27. Bayesian epistemology - Stanford Encyclopedia of Philosophy, https://plato.stanford.edu/entries/epistemology-bayesian/ 28. Collective opinion formation model under Bayesian updating and ..., https://link.aps.org/doi/10.1103/PhysRevE.87.062123 29. Partisan Bias and the Bayesian Ideal in the Study of Public Opinion | The Journal of Politics, https://www.journals.uchicago.edu/doi/abs/10.1017/S0022381609090914 30. Paraconsistency in Legal Systems: Why Not to ... - Scholars Archive, https://scholarsarchive.library.albany.edu/cgi/viewcontent.cgi?article=1122&context=etd 31. Paraconsistency and Dialetheism - to appear in Handbook of the History and Philosophy of Logic, eds. D. Gabbay and J. Woods - Hesperus is Bosphorus, https://hesperusisbosphorus.wordpress.com/wp-content/uploads/2012/03/priest-graham-paraconsistency-and-dialetheism.pdf 32. Graham Priest on Dialetheism and Paraconsistency | Request PDF - ResearchGate, https://www.researchgate.net/publication/338332682_Graham_Priest_on_Dialetheism_and_Paraconsistency 33. Paraconsistent logic - Graham Priest - PhilPapers, https://philpapers.org/rec/PRIPL 34. Ralph Dumain: "The Autodidact Project": Graham Priest vs Erwin Marquit on Contradiction, http://www.autodidactproject.org/my/priest-limits-3.html 35. One Heresy and One Orthodoxy: On Dialetheism, Dimathematism, and the Non-normativity of Logic - PMC, https://pmc.ncbi.nlm.nih.gov/articles/PMC10827935/ 36. Biomimetic organizational structures and networks | Biomimicry in Business Innovation Class Notes | Fiveable, https://library.fiveable.me/biomimicry-in-business-innovation/unit-6/biomimetic-organizational-str

uctures-networks/study-guide/AtzwgcDTQXDqw79V 37. Tensor Decompositions and Applications | SIAM Review, https://epubs.siam.org/doi/10.1137/07070111X 38. ECE 804 - Dr Nikos Sidiropoulos - Tensor Decomposition Theory and Algorithms in the Era of Big Data - YouTube, https://www.youtube.com/watch?v=f12hkIBAo9E 39. Tensor Decompositions and Applications | SIAM Review - Computer Science Cornell, https://www.cs.cornell.edu/courses/cs6241/2019sp/readings/Kolda-Bader-2008-survey.pdf 40. Tensor decomposition for analysing time-evolving social networks: an overview | Request PDF - ResearchGate, https://www.researchgate.net/publication/345101002_Tensor_decomposition_for_analysing_time-evolving_social_networks_an_overview 41. Tensor Decomposition for Network Analysis - Number Analytics, https://www.numberanalytics.com/blog/tensor-decomposition-for-network-analysis 42. Percolation threshold - Wikipedia, https://en.wikipedia.org/wiki/Percolation_threshold 43. Percolation theory - Wikipedia, https://en.wikipedia.org/wiki/Percolation_theory 44. The Impact of Heterogeneous Thresholds on Social Contagion with Multiple Initiators, https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0143020 45. The Pareto effect in tipping social networks: from minority to majority - ESD, https://esd.copernicus.org/articles/16/189/2025/ 46. Key concepts - Global Tipping Points, https://report-2023.global-tipping-points.org/introduction/key-concepts/ 47. www.numberanalytics.com, https://www.numberanalytics.com/blog/mastering-percolation-theory#:~:text=In%20social%20network%20analysis%2C%20percolation,the%20emergence%20of%20social%20movements. 48. Advanced Percolation Techniques for Social Networks - Number Analytics, https://www.numberanalytics.com/blog/advanced-percolation-techniques-for-social-networks 49. Biomimicry Design Principles - Sites at Lafayette, https://sites.lafayette.edu/biomimicry/2022/03/19/biomimicry-design-principles/ 50. Biomimetic Leadership: From Theory to Practice - ERIC, https://files.eric.ed.gov/fulltext/EJ1231169.pdf 51. Resilience of neural networks for locomotion - PubMed, https://pubmed.ncbi.nlm.nih.gov/34187088/ 52. Biomimetic Management: What Natural Ecosystems Can Teach Management - Futurity Proceedings, http://futurity-proceedings.com/index.php/home/article/download/234/233 53. Biomimetic Leadership: Core Beliefs for Sustainable Organizations - ResearchGate, https://www.researchgate.net/publication/367040711_Biomimetic_Leadership_Core_Beliefs_for_Sustainable_Organizations 54. Biomimetic Organisations: A Management Model that Learns from Nature - MDPI, https://www.mdpi.com/2071-1050/12/6/2329 55. Cognitive revolution - (Intro to Cognitive Science) - Vocab, Definition, Explanations | Fiveable, https://library.fiveable.me/key-terms/introduction-cognitive-science/cognitive-revolution 56. Charting the Cognitive Revolution: Milestones Leading to Universal Grammar - Medium, https://medium.com/@riazleghari/charting-the-cognitive-revolution-milestones-leading-to-universal-grammar-7c921dc7197f 57. Computational Social Science and Sociology - PMC, https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8612450/ 58. Centrality and Charisma: Comparing How Leader Networks and Attributions Affect Team Performance - ResearchGate, https://www.researchgate.net/publication/51622789_Centrality_and_Charisma_Comparing_How_Leader_Networks_and_Attributions_Affect_Team_Performance 59. A Network Effects Model of Charisma Attributions | Request PDF - ResearchGate, https://www.researchgate.net/publication/270330384_A_Network_Effects_Model_of_Charisma_Attributions 60. Charisma in Everyday Life: Conceptualization and Validation of the General Charisma Inventory - Social Perception and Cognition Lab - University of Toronto,

https://rule.psych.utoronto.ca/pubs/2018/Tskhay2018_Charisma_in_everyday_life.pdf 61. Computational charisma—A brick by brick blueprint for building charismatic artificial intelligence - Frontiers, https://www.frontiersin.org/journals/computer-science/articles/10.3389/fcomp.2023.1135201/pdf 62. Artificial Intelligence in Digital Marketing: Enhancing Consumer Engagement and Supporting Sustainable Behavior Through Social and Mobile Networks - MDPI, https://www.mdpi.com/2071-1050/17/14/6638 63. DAO Governance Models: What You Need to Know - Metana, https://metana.io/blog/dao-governance-models-what-you-need-to-know/ 64. Confessions of a Reluctant Revolutionary | Columbia Magazine, https://magazine.columbia.edu/article/confessions-reluctant-revolutionary 65. DAO Governance Models 2024: Ultimate Guide to Token vs. Reputation Systems, https://www.rapidinnovation.io/post/dao-governance-models-explained-token-based-vs-reputation-based-systems 66. DAOs: The Future of Decentralized Governance - Scalable Human Blog, https://scalablehuman.com/2024/01/16/daos-the-future-of-decentralized-governance/ 67. What is a DAO, or decentralized autonomous organization? - University of Miami News, https://news.miami.edu/stories/2023/02/what-is-a-dao-or-decentralized-autonomous-organization.html 68. What Is a DAO's Role in Decentralized Governance? | Gemini, https://www.gemini.com/cryptopedia/dao-crypto-decentralized-governance-blockchain-governance 69. Algorithmic bias, data ethics, and governance: Ensuring fairness, transparency and compliance in AI-powered business analytics applications, https://journalwjarr.com/sites/default/files/fulltext_pdf/WJARR-2025-0571.pdf 70. Epistemic Algorithmic Injustice → Term - Fashion → Sustainability Directory, https://fashion.sustainability-directory.com/term/epistemic-algorithmic-injustice/ 71. Epistemic Injustice in Generative AI - arXiv, https://arxiv.org/html/2408.11441v1 72. Intellectuals and Thugs: The Russian Revolution - Geopolitical Futures, https://geopoliticalfutures.com/intellectuals-thugs-russian-revolution/ 73. AN INTRODUCTION TO THE POLITICAL PHILOSOPHY OF THE CONSTITUTION, https://www.civiced.org/papers/political.html 74. BRIA 20 2 c Hobbes, Locke, Montesquieu, and Rousseau on Government - Online Lessons - Bill of Rights in Action - Teach Democracy, https://teachdemocracy.org/bill-of-rights-in-action/bria-20-2-c-hobbes-locke-montesquieu-and-rousseau-on-government.html 75. 6.2 Philosophical Roots of Modern Government – Introduction to Philosophy, https://pimaopen.pressbooks.pub/introphilosophy/chapter/6-2-philosophical-roots-of-modern-government/ 76. Revolutionary intellectuals - Africa Is a Country, https://africasacountry.com/2018/05/revolutionary-intellectuals 77. Philosophy & Artist Residencies | Museum of Every Day Life, https://museumofeverydaylife.org/philosophy-department/philosophy-residencies 78. Philosopher in Residence Fellowship - Institute for Advanced Study (IAS) - TUM-IAS, https://www.ias.tum.de/ias/programs/fellowship-programs/philosopher-in-residence-fellowship/ 79. Home | Ethics in AI, https://www.oxford-aiethics.ox.ac.uk/ 80. Philosophy, ethics, and the pursuit of 'responsible' artificial intelligence | RIT, https://www.rit.edu/news/philosophy-ethics-and-pursuit-responsible-artificial-intelligence 81. SOCIAL TRAPS AND THE PROBLEM OF TRUST, http://ndl.ethernet.edu.et/bitstream/123456789/42983/1/30.BO%20ROTHSTEIN.pdf 82. Social Science and Its Critics: An Ideological Analysis - Cambridge University Press, https://www.cambridge.org/core/journals/social-philosophy-and-policy/article/social-science-and-its-critics-an-ideological-analysis/4B632B87DB4CFF616A3C7D5401AD34FE 83. Formal models of the scientific community and the value-ladenness of science - PhilArchive,

https://philarchive.org/archive/POLFMO 84. (PDF) Formal Modeling in Social Science - ResearchGate,
https://www.researchgate.net/publication/332813964_Formal_Modeling_in_Social_Science 85. Explanation, Formal Models, and Rational Choice - Knowledge Base, http://home.uchicago.edu/~sashwort/conceptualizing.pdf 86. "Formal Modeling in Philosophy of Science – Let's be realistic!" by Edouard Machery,
https://www.youtube.com/watch?v=IXHhzUq2djU 87. (PDF) Algorithmic Sentience: Ethical and Technological Challenges ...,
https://www.researchgate.net/publication/392029278_Algorithmic_Sentience_Ethical_and_Technological_Challenges_in_AI_Consciousness 88. Ethics of Artificial Intelligence | Internet Encyclopedia of Philosophy, https://iep.utm.edu/ethics-of-artificial-intelligence/ 89. Algorithmic Conscience: An In-Depth Inquiry into Ethical Dilemmas in Artificial Intelligence - International Journal of Research and Innovation in Social Science,
https://rsisinternational.org/journals/ijriss/articles/algorithmic-conscience-an-in-depth-inquiry-into-ethical-dilemmas-in-artificial-intelligence/ 90. 1 EPISTEMIC INJUSTICE AND DATA SCIENCE TECHNOLOGIES John Symons and Ramón Alvarado Forthcoming in Synthese 2/19/2022 Abstract T,
https://www.johnsymons.net/wp-content/uploads/2022/02/Epistemic-Injustice-and-Data-Science-Tech-final.pdf 91. Project Cybersyn - Wikipedia, https://en.wikipedia.org/wiki/Project_Cybersyn 92. Cybernetic Revolutionaries: Technology and Politics in Allende's Chile - Uberty,
https://uberty.org/wp-content/uploads/2015/10/Eden_Medina_Cybernetic_Revolutionaries.pdf 93. Project Cybersyn: Chile 2.0 in 1973 - iRevolutions,
https://irevolutions.org/2009/02/21/project-cybersyn-chile-20-in-1973/ 94. Working Paper No. 67, Insights into Project Cybersyn - PDXScholar,
https://pdxscholar.library.pdx.edu/cgi/viewcontent.cgi?article=1069&context=econ_workingpapers 95. Discuss the role of intellectuals during the Chinese Revolution. - TutorChase,
https://www.tutorchase.com/answers/a-level/history/discuss-the-role-of-intellectuals-during-the-chinese-revolution 96. The Intellectuals and the Russian Revolution - Marxists Internet Archive, https://www.marxists.org/archive/rutgers/1921/intellectuals.htm