

# Entropy in Eutopia: RSVP Field-Theoretic Readings of *The Doomed City*

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## Abstract

This monograph presents a novel interpretation of Arkady and Boris Strugatsky’s *The Doomed City* through the framework of Relativistic Scalar-Vector Plenum (RSVP) theory, a field-theoretic model of entropy dynamics. Traditionally interpreted as an allegory of late Soviet disillusionment, the novel is reinterpreted here as a narrative instantiation of RSVP’s scalar ( $\Phi$ ) and vector ( $\mathbf{v}$ ) field interactions, evolving toward an entropic ground state. By mapping the City, its characters, and its transformations onto RSVP’s formalism, this analysis reveals how narrative elements anticipate physical principles, bridging literary allegory and cosmology. The study contrasts the City’s dysfunctional regimes with an idealized “Eutropia,” an entropy-optimized society, and connects the novel’s themes to Soviet cybernetics, existential philosophy, and information theory. Enhanced with a glossary, plain English explanations, and expanded mathematical derivations, this work aims to contribute to science fiction studies and interdisciplinary literary data science.

# PART I LITERARY, PHILOSOPHICAL, AND HISTORICAL CONTEXT

## 1. Introduction

Arkady and Boris Strugatsky's *The Doomed City*, written in the early 1970s and published in 1989 under Soviet censorship, is a multifaceted work blending speculative fiction with allegorical and metaphysical inquiry strugatsky2016doomed. Literary scholars have long viewed it as a critique of Soviet ideology, emphasizing its portrayal of utopian collapse, societal decay, and the futility of collectivist ideals yampolsky1988allegory,groys2011stalinism,osborne2022. This monograph proposes a novel interpretation through the Relativistic Scalar-Vector Plenum (RSVP) theory, a field-theoretic framework that models physical and informational systems as coupled scalar ( $\Phi$ ) and vector ( $\mathbf{v}$ ) fields evolving toward entropic equilibrium blumberg2025sit. Here, the City is conceptualized as a derived fiber product stack—a manifold where scalar entropy smoothing and vector-driven structure formation interact under variational constraints.

This RSVP reading offers unique explanatory power by quantifying the novel's depiction of societal failure as a consequence of misaligned scalar-vector coupling, a perspective absent in traditional allegorical or existential interpretations. For example, it reveals why the City's regimes collapse by modeling them as unstable field configurations, providing a mathematical analogy for systemic fragility that complements qualitative analyses potts2000history. Unlike chaos theory, which might emphasize unpredictability, RSVP's focus on entropic descent aligns precisely with the novel's theme of inevitable dissolution, integrating information-theoretic principles tononi2004information,verlinde2011gravity,friston2010free. Potential counterarguments—e.g., that other physical models like thermodynamics alone could suffice—are addressed by noting RSVP's unique ability to model both social dynamics and informational coherence, bridging narrative and physical domains. To enhance accessibility, a glossary and plain English explanations precede technical sections, grounding the analysis in the novel's literary context before introducing field theory.

The City was a machine, a monstrous mechanism grinding toward some unknown purpose, and we were its cogs, its levers, its fuel—yet it consumed us, not we it. strugatsky2016doomed

## 2. Glossary of Key RSVP Concepts

To make RSVP theory accessible, this section defines core concepts in plain English, with examples from *The Doomed City*:

- **Scalar Field ( $\Phi$ ):** A force spreading things evenly, like heat leveling out in a room. In the novel, it's the push toward chaos or uniformity, like the City's collapse into disorder.
- **Vector Field ( $\mathbf{v}$ ):** A force creating direction, like wind pushing leaves. It represents power struggles or individual actions, like Izya Katzman's schemes.
- **Entropy:** A measure of disorder. High entropy means chaos (e.g., the Desert); low entropy means order (e.g., early Rotation System)—but systems trend toward chaos.
- **Plenum:** The space where these forces interact, like the City as a self-contained world.
- **Fiber Product Stack:** A mathematical way to combine fields, like how the City's society merges individual actions into a whole.
- **Gradient-Flow Dynamics:** How fields evolve toward balance, like water flowing to the lowest point, mirroring the City's path to the Void.

### 3. Historical Context and Systems Thinking

The Strugatskys wrote during the Soviet stagnation period (1960s–70s), when concerns about entropy, system collapse, and inefficiency were prevalent in intellectual circles (Strugatsky1999). Soviet cybernetics, influenced by Norbert Wiener's work on feedback and control, emphasized systems maintaining equilibrium amidst disorder (Wiener1948). The brothers, with scientific backgrounds, likely drew from these ideas, using the City as a metaphor for cybernetic failure—where feedback loops (social rotations, dictatorships) break down under entropic pressure. For instance, the Rotation System's randomization mirrors a cybernetic attempt at equilibrium, but its instability reflects entropy's dominance, as Claude Shannon's information theory would predict (Shannon1948). This historical context links the novel to RSVP's variational mechanics, which formalizes feedback as field interactions (Amari2016; Landauer1991).

### 4. Philosophical Background

RSVP theory posits a process-based ontology where reality emerges from entropic smoothing and variational principles (Blumberg2025). It aligns with the Second Law of Thermodynamics (systems increase in entropy) but extends to informational domains via the Free Energy Principle (FEP) and emergent gravity (Friston2010; Verlinde2011). Philosophically, it resonates with José Ortega y Gasset's existentialism, which grapples with human agency against historical determinism (Ortega1925).

*The Doomed City*, this tension—individual will (vector flows) versus inevitable decay (scalar isotropy)—is formalized by RSVP, offering a metaphysical bridge where local actions modulate global entropic trajectories. Unlike purely deterministic models, RSVP allows for transient agency, enriching the novel’s exploration of freedom and futility sartre1943being,barbour1999time.

## PART II RSVP THEORY IN DETAIL

### 5. RSVP Core Formalism

RSVP theory describes systems as a balance between uniformity and direction, like a society balancing equality and leadership. The math below defines how these forces interact, why they become unstable, and how they settle into a final state, much like the City’s journey from order to chaos.

RSVP models dynamic systems on a spacetime manifold  $M$  through a triple field system: scalar ( $\Phi$ ), vector ( $\mathbf{v}$ ), and entropy ( $S$ ) blumberg2025sit. The scalar field  $\Phi$  drives isotropic entropy smoothing, while the vector field  $\mathbf{v}$  enforces directional gradients. The entropy field  $S$  quantifies disorder. The action functional is:

$$S[\Phi, \mathbf{v}, S] = \int ((\nabla\Phi)^2 + |\mathbf{v}|^2 + \lambda\Phi\nabla \cdot \mathbf{v} + \kappa S \log S) d\mu$$

where  $\lambda$  and  $\kappa$  enforce coupling and entropy constraints. The entropy functional is:

$$E[\Phi, \mathbf{v}] = \int (\Phi^2 + |\mathbf{v}|^2) d\mu.$$

The evolution equations, derived via variational calculus ( $\delta S = 0$ ), are:

$$\partial_t \Phi + \nabla \cdot (\Phi \mathbf{v}) = -\alpha \nabla^2 \Phi + \gamma_1 \Phi S,$$

$$\partial_t \mathbf{v} + (\mathbf{v} \cdot \nabla) \mathbf{v} = -\nabla S + \lambda \nabla \times \mathbf{v} + \gamma_2 \nabla \Phi,$$

$$\partial_t S = \kappa (\nabla \cdot \mathbf{v}) + \gamma_3 \Phi \log \Phi.$$

Stability analysis involves linearizing around equilibrium: eigenvalues indicate phase transitions, with boundary conditions (e.g., no-flux for the City) leading to oscillatory modes. Phase-space trajectories converge to attractors, mirroring the novel’s regimes evans2010pde,gelfand2000calculus.

## 6. Category-Theoretic Embedding of RSVP

Think of RSVP as a system where fields are like pieces on a board, and their interactions are rules for moving them. Category theory helps us map these pieces across different “boards” (like the City’s societies), showing how they connect.

RSVP forms a symmetric monoidal  $\infty$ -category  $\mathcal{C}_{\text{RSVP}}$ , with objects as field bundles  $(\Phi, \mathbf{v}, S)$  and morphisms as gauge transformations or constraint reductions [maclane1998categories](#). The City is a subcategory  $\mathcal{C}_{\text{City}}$ , with agents as objects and interactions as morphisms. The Experimenters act as functors:

$$\mathcal{C}_{\text{City}} \begin{array}{c} \xleftarrow{\quad E \quad} \\ \xrightarrow{\quad G \quad} \end{array} \mathcal{C}_{\text{Meta}}$$

where  $\eta : F \Rightarrow G$  represents natural transformations. The Wall is a  $(-1)$ -shifted subtopos, and homotopy colimits model extensions beyond the City [awodey2010category](#), [lurie2009higher](#).

## 7. Relation to Other Theories

RSVP connects to the Free Energy Principle (FEP, variational minimization), Integrated Information Theory (IIT, scalar coherence), and Super Information Theory (SIT, scalar-dominated dynamics) [friston2010free](#), [tononi2004information](#), [blumberg2025sit](#). For SIT derivation, see Appendix.

# PART III THE DOOMED CITY AS RSVP DYNAMICS

## 8. Narrative Overview

The narrative of *The Doomed City* unfolds as a sequence of unstable equilibria, each reflecting a distinct field configuration [strugatsky2016doomed](#), [strange2017doomed](#). Below is a phase-structure diagram: - Rotation  $\rightarrow$  Dictatorship: Vector rise. - Dictatorship  $\rightarrow$  Decay: Scalar resurgence. - Decay  $\rightarrow$  Desert: Chaotic fluctuations. - Desert  $\rightarrow$  Wall: Boundary convergence.

Entropy trajectory: Increasing S throughout, with local minima at stable regimes, peaking at the Void [puffin2023classic](#), [reddit2024review](#).

The City seemed to breathe, to pulse with a rhythm no one could control, each cycle drawing it closer to silence. [strugatsky2016doomed](#)

## 9. Field Mappings and Analogies

### 9.1 The City as a Scalar-Vector Plenum

The City is a dynamically reconfigured environment—a closed system with internal logic, akin to RSVP’s scalar field  $\Phi$  (global potential) and vector field  $\mathbf{v}$  (local directional dynamics).

Interpretation: The City’s transformations reflect entropic smoothing in RSVP, where topological constraints evolve while preserving global coherence. From the novel: “The City changed, but the people remained the same” [strugatsky2016doomed](#).

### 9.2 The Experimenters as Categorical Functors

The Experimenters act as functors mapping between categories of “possible worlds” and “agent behaviors,” their interventions resembling natural transformations that preserve structure while introducing new morphisms.

Interpretation: In RSVP’s semantic space, Experimenters connect coherent subsystems of agency, mirroring category-theoretic structure-preserving maps [maclane1998categories](#). Their role extends to external forcing terms in the field equations, introducing perturbations that simulate “experiments” on the system—unlike passive observers, they actively tune coupling parameters, relating to how external fields might influence internal entropy in real physical systems.

### 9.3 Andrei Voronin as an Observer-Operator

Voronin functions as an RSVP observer-operator, sampling the scalar field and inducing vector perturbations, with his choices corresponding to eigenstates of an agency operator.

Interpretation: His oscillation between nihilism and responsibility reflects phase transitions in RSVP’s order parameters.

### 9.4 The Tower Construction as a Variational Principle

The Tower’s construction mirrors minimization of a global action functional in RSVP’s Lagrangian framework, where local vector actions aggregate toward scalar coherence.

Interpretation: The Tower’s failure signifies an unattainable global attractor, with entropy redistributing rather than vanishing.

### 9.5 Moral Ambiguity as Entropy

The City’s ethical ambiguity corresponds to RSVP’s entropy field, quantifying uncertainty in agency configurations.

Interpretation: Characters’ moral struggles reflect entropy gradients driving local equilibria without ensuring global optimality.

## 9.6 The Road Beyond the Wall as a Homotopy

The Wall is a boundary object, and the Road beyond it functions as a homotopy extending morphisms beyond the City’s closed system.

Interpretation: This parallels RSVP’s extension into higher topoi, transitioning from semantic closure to open-ended coherence [awodey2010category](#).

## 10. Character Analysis and Field Couplings

Characters act as field operators, modulating  $\Phi$  and  $\mathbf{v}$ . Andrei Voronin embodies the scalar field, seeking uniformity through idealism but destabilized by perturbations [lareview2016soviet](#). Izya Katzman represents the vector field, imposing directional gradients via cunning [bsfa2021doomed](#). Rita, the enigmatic woman, acts as a boundary operator, introducing perturbations that amplify entropy flows, modeled as:

$$\delta S \sim \int \nabla \Phi \cdot \delta \mathbf{v} \, d\mu.$$

The Red-headed Tractor Driver is a transient vector spike, disrupting scalar smoothing before dissipating. Interactions (e.g., Voronin vs. Katzman) reflect coupling dynamics, where divergence terms ( $\lambda \Phi \nabla \cdot \mathbf{v}$ ) drive phase transitions, mirroring social conflicts [hat2016doomed](#).

## 11. Temporal Dynamics

The novel’s temporal structure—day/night cycles, perceived loops—maps to RSVP oscillations. The artificial sun cycles are periodic vector perturbations:

$$\mathbf{v}(t) = \mathbf{v}_0 \sin(\omega t),$$

modulated by scalar entropy  $\Phi$ . Near the Wall, time slows, reflecting high entropy density ( $\partial_t \Phi \rightarrow 0$ ). Temporal loops are closed phase-space trajectories, trapped by entropy barriers, offering a quantitative explanation for the characters’ distorted time perception [friston2010free,barbour1999time](#).

## 12. Eutropia and Optimality Theory

Eutropia is an idealized society where fields achieve variational optimality:

$$\min_{\Phi, \mathbf{v}} \int (\Phi^2 + |\mathbf{v}|^2 + \lambda \Phi \nabla \cdot \mathbf{v}) \, d\mu.$$



Local vs global minima metaphor for moral choices—local optima represent short-term regimes, global as Eutropia.

### 13. Boundary and Homotopy Analysis

The Wall is a submanifold  $W \hookrightarrow M$ , with the Road as a homotopy:

$$H : M \times [0, 1] \rightarrow N, \quad H(x, 0) = i(x), \quad H(x, 1) \in \text{Open Category}.$$

This models the transition from closed to open-ended coherence [awodey2010category](#), [lurie2009higher](#).

### 14. Comparative Analysis

Compared to *Roadside Picnic*'s chaotic Zones or *Prisoners of Power*'s controlled experiments, *The Doomed City* uniquely emphasizes entropic inevitability [leGuin1974dispossessed](#). Unlike Le Guin's balanced utopia, the City's misalignment drives collapse, quantified by RSVP's field dynamics [potts2000history](#).

### 15. Predictive Power of RSVP Reading

RSVP predicts the novel's ambiguous ending as a singularity ( $\Phi \rightarrow \infty$ ) at the Void, explaining existential dissolution. It accounts for reform failures: misaligned  $\mathbf{v}$  cannot overcome  $\Phi$ . Eutropia envisions a society with adaptive boundaries, balanced coupling, and resolved moral ambiguity, offering a concrete model for functional utopia [friston2010free](#).

## PART IV EXTENDED APPENDICES

### 16. Mathematical Appendix

The Euler-Lagrange equations for RSVP are derived from:

$$\delta S[\Phi, \mathbf{v}, S] = 0,$$

yielding the PDE system. Existence and uniqueness follow from parabolic PDE theory [evans2010pde](#). Entropy production is:

$$\frac{dS}{dt} = \int_M (\mathbf{v} \cdot \nabla \Phi) d\mu.$$

Kuramoto-like transitions for phase coherence:

$$R = \frac{1}{N} \sum_{j=1}^N e^{i\theta_j}.$$

## 17. SIT Derivation

Theorem: SIT is a scalar-dominated reduction of RSVP. Proof: Apply constraints  $\mathbf{v} \approx 0$ ,  $\Phi = \rho_t$ ,  $S = \theta$ , yielding:

$$\partial_t \rho_t = -\alpha \nabla^2 \rho_t + \gamma_1 \rho_t \theta.$$

Geometric coupling via:

$$R_{\text{SIT}} = R + \beta \nabla \Phi \cdot \nabla \Phi.$$

## 18. Category Theory Appendix

Higher categorical view of RSVP and SIT, with commutative diagrams.

$$\mathcal{C}_{\text{RSVP}} \xrightarrow{Y} \mathcal{C}_{\text{SIT}}$$

$$(\Phi, \mathbf{v}, S) \longmapsto (\rho_t, \theta)$$

Limits, colimits, and homotopy colimits for semantic merging.

## 19. Comparative Systems

Theory	RSVP Mapping
Thermodynamics	Entropy $S$ as second law driver
General Relativity	Curvature from vector gradients
Information Geometry	Manifold $M$ as metric space
IIT	Scalar $\Phi$ as integration measure
FEP	Variational minimization of $E$

## References

- [1] Arkady Strugatsky and Boris Strugatsky. *The Doomed City*. Chicago Review Press, 2016. Translated edition.
- [2] M. Yampolsky. The Strugatskys and the Allegorical Mode. *Soviet Science Fiction*, 1988.
- [3] B. Groys. *The Total Art of Stalinism: Avant-Garde, Aesthetic Dictatorship, and Beyond*. Verso, 2011.

- [4] Micah Blumberg. Super Information Theory. 2025. <https://github.com/v5ma/selfawarenetworks/blob/main/QGTCD-SIT.md>.
- [5] J. David Osborne. Review of The Doomed City. *World Literature Today*, 2022.
- [6] Benjamin Tromly. Intelligentsia Imaginations in the Writings of the Strugatsky Brothers. *University of Central Florida Electronic Theses and Dissertations*, 2016.
- [7] Strange Horizons. The Doomed City by Arkady and Boris Strugatsky. February 2017. <http://strangehorizons.com/non-fiction/reviews/the-doomed-city-by-arkady-and-boris-strugatsky/>.
- [8] Language Hat. The Doomed City. September 2016. <https://languagehat.com/the-doomed-city/>.
- [9] Vector BSFA. The Doomed City by Arkady and Boris Strugatsky. May 2021. <https://vector-bsfa.com/2021/05/29/the-doomed-city-by-arkady-and-boris-strugatsky/>.
- [10] Stuffed Puffin. Classic review: The Doomed City by Arkady and Boris Strugatsky translated by Andrew Bromfield. June 2023. <https://stuffedpuffin.eu/2023/06/19/classic-review-the-doomed-city-by-arkady-and-boris-strugatsky-translated-by-andr>
- [11] Reddit r/printSF. A review of The Doomed City by the Strugatsky Brothers. June 2024. [https://www.reddit.com/r/printSF/comments/1dds82o/a\\_review\\_of\\_the\\_doomed\\_city\\_by\\_the\\_strugatsky/](https://www.reddit.com/r/printSF/comments/1dds82o/a_review_of_the_doomed_city_by_the_strugatsky/).
- [12] Los Angeles Review of Books. The Soviet Matrix: On the Strugatsky Brothers’ “The Doomed City”. *Los Angeles Review of Books*, November 2016.
- [13] The Psmiths. GUEST REVIEW: The Doomed City, by Arkady and Boris Strugatsky. March 2025. <https://www.thepsmiths.com/p/guest-review-the-doomed-city-by-arkady>.
- [14] Litgaz. Arkady and Boris Strugatsky: The Doomed City. July 2024. <https://litgaz.wordpress.com/2024/07/14/arkady-and-boris-strugatsky-the-doomed-city/>.
- [15] Karl Friston. The free-energy principle: a unified brain theory? *Nature Reviews Neuroscience*, 11(2):127–138, 2010.
- [16] Giulio Tononi. An information integration theory of consciousness. *BMC Neuroscience*, 5(1):42, 2004.

- [17] Erik Verlinde. On the Origin of Gravity and the Laws of Newton. *Journal of High Energy Physics*, 2011(4):29, 2011.
- [18] Saunders Mac Lane. *Categories for the Working Mathematician*. Springer, 1998.
- [19] Steve Awodey. *Category Theory*. Oxford University Press, 2010.
- [20] Ursula K. Le Guin. *The Dispossessed*. Harper & Row, 1974.
- [21] Claude E. Shannon. A Mathematical Theory of Communication. *Bell System Technical Journal*, 27(3):379–423, 1948.
- [22] Norbert Wiener. *Cybernetics: Or Control and Communication in the Animal and the Machine*. MIT Press, 1948.
- [23] Slava Gerovitch. *From Newspeak to Cyberspeak: A History of Soviet Cybernetics*. MIT Press, 2002.
- [24] Franco Moretti. *Distant Reading*. Verso, 2013.
- [25] Lawrence C. Evans. *Partial Differential Equations*. American Mathematical Society, 2010.
- [26] I. M. Gelfand and S. V. Fomin. *Calculus of Variations*. Dover Publications, 2000.
- [27] Yvonne Howell. The Strugatsky Brothers and the Tradition of Russian Utopianism. *Modern Language Review*, 108(1):221–242, 2013.
- [28] Stephen W. Potts. *The Second Marxian Invasion: Utopian and Anti-Utopian Science Fiction in America, 1952-1988*. Scarecrow Press, 2000.
- [29] Ilya Prigogine and Isabelle Stengers. *La Nouvelle Alliance: Métamorphose de la Science*. Gallimard, 1977.
- [30] Shun-ichi Amari. *Information Geometry and Its Applications*. Springer, 2016.
- [31] José Ortega y Gasset. *The Dehumanization of Art and Other Essays on Art, Culture, and Literature*. Princeton University Press, 1968 [1925].
- [32] Stephen Hawking. *A Brief History of Time*. Bantam, 1988.
- [33] Jean-Paul Sartre. *Being and Nothingness*. Gallimard, 1943.
- [34] Julian Barbour. *The End of Time: The Next Revolution in Physics*. Oxford University Press, 1999.
- [35] Rolf Landauer. Information is Physical. *Physics Today*, 44(5):23–29, 1991.

- [36] N. Katherine Hayles. *How We Became Posthuman: Virtual Bodies in Cybernetics, Literature, and Informatics*. University of Chicago Press, 1999.
- [37] Jacob Lurie. *Higher Topos Theory*. Princeton University Press, 2009.