SOCIAL SPACETIME

A Geometric Model of Our Social World

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The author declares no conflicts of interest.

Ethics Statement
None.

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Section 1: Social Spacetime

All social life unfolds within social spacetime: a continuous structured social field [figure 1]. Social resources (such as electricity, oil, and water) and social objects (people and contagions) are also embedded within this field. In this framework, the terms social field and social fabric refer to the same continuous social environment: field emphasizes pervasive influence, while social fabric emphasizes patterned structure. The concept of curvature is used here in a structural and conceptual sense. It describes how constraints and influences shape possible motion within the social field, rather than as a literal mathematical or physical model.

The diagrams in this paper are schematic and are intended to illustrate structural relationships rather than represent empirical measurements. Each figure illustrates constraints rather than measures them.

Figure 1. The Fabric of Social Spacetime

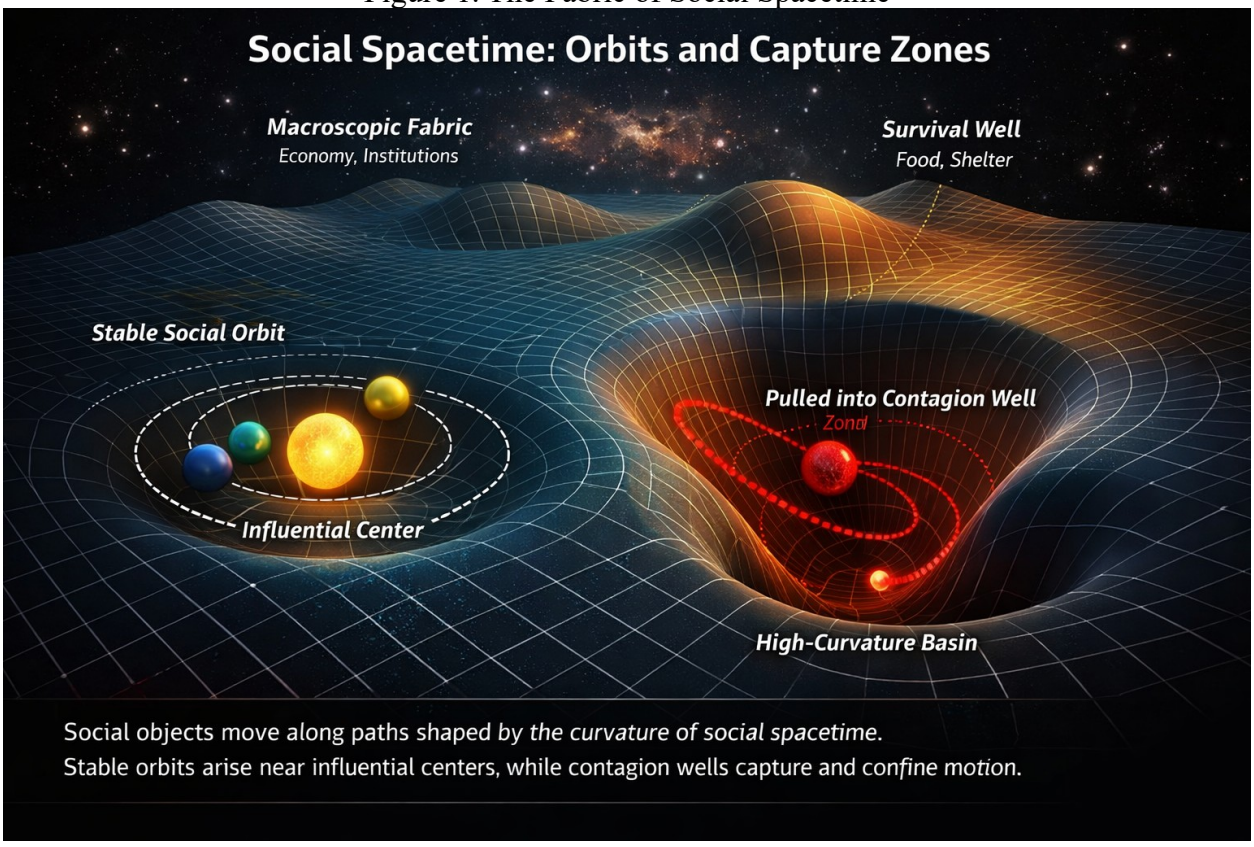

Figure 1. The fabric of social spacetime is a continuous field in which social objects and resources are embedded.

While this framework shares surface language with prior work on social space, stratification, mobility, and network structure, it does not operate at the same analytical level as those traditions. Existing approaches typically model social position as discrete categories, relational ties, or statistical outcomes, whereas social spacetime concerns the underlying

structure that shapes which movements, connections, and transitions are possible in the first place. Rather than modifying or extending existing models, this framework provides a geometric description of social structure that is logically prior to measurement, classification, or empirical outcome. Its purpose is not to replace established approaches, but to offer a *unifying* structural language for understanding constraint, motion, and transformation across social contexts.

Social spacetime is continuous and uninterrupted. There are no regions in which social influence ceases; every presence contributes to the surrounding field. Social objects function as sources and receivers of influence, and their motion is shaped by the curvatures produced by the five laws of social spacetime. These curvatures manifest as tendencies, attractions, resistances, or deflections, giving rise to recognizable social structures such as hierarchies, alliances, chains of influence, and patterns of contagion.

When the trajectories of social objects intersect through immediate influence, this produces a collision, or direct value connection: for example, a person adopting an idea after seeing a trusted friend express it, or a contagion reaching someone who acts on it immediately. Such collisions alter motion by transferring influence directly. Indirect value connections occur when influence travels through intermediaries or networks before shaping a social object's trajectory.

A social object (people and contagions) is never free from curvature, even in isolation. In the absence of direct interaction or visible connection, it remains embedded within larger social objects, particularly those governed by the fifth law (societal level structures). Societal structures such as economies, governments, political systems, housing markets, and institutions exert curvature across wide regions of social spacetime. Their effects do not require proximity to be experienced.

Even extreme physical or social isolation does not remove an object from the field. Survival itself generates curvature. The requirements of food, water, shelter, and energy place every social object within Law 1 (survival) curvature regardless of context. Social resources retain influence whether or not they are consciously perceived, contagions exert gravitational pull whether resisted or ignored. The absence of visible ties therefore reflects the dominance of other curvatures, not escape from the field.

Social fabrics are the patterns that emerge from motion within this field. They are structures of connectivity rather than material substance: social objects move within the social field, which constrains trajectories and directs interactions. Curvature is local and relational: it shapes trajectories where it is encountered, without permanently altering the entire field.

A social object’s path through social spacetime is shaped by survival pressures, social influence, and moral constraint. The concepts of id, ego, and superego function here as structural orientations: they represent distinct constraints or priorities within the field rather than independent psychological causes. The id corresponds to regions dominated by immediate survival, the ego to navigation through landscapes of social influence and opportunity, and the superego to motion constrained by moral order and institutional structure. Used in this way, the id, ego, and superego are not psychological heuristics but formal components of social

spacetime, describing how different forms of constraint shape possible movement within social fabrics.

Social spacetime contains hierarchies of influence without collapsing into singular centers. Proximity matters—not only to people, but also to contagions and resources. Near regions of strong curvature, trajectories bend sharply; in regions of mild curvature, long arcs of motion form, appearing as projects, ambitions, creative paths, and sustained pursuits. Extreme curvature constrains motion into narrow survival arcs, emergency responses, or rapid realignments.

In certain parts of social spacetime, the same constraints stay in place over time, so social objects tend to move in the same patterns again and again. These do not collapse inward or escape outward, but recur within the same curved environment. Such motion appears as social orbits: long-term roles, routines, affiliations, or cycles in which social objects remain bound to enduring configurations of survival demands, social influence, goals, moral structures, or institutions (societal structures). These orbits arise not from deliberate design, but from the persistence and shape of the surrounding field.

This section has outlined social spacetime as a structured field of curvature in which trajectories, influence, and patterns emerge. Describing social motion in these terms provides a foundation for modeling the architecture of social fabrics and analyzing how social worlds organize within a fixed, law-governed structure.

This framework is not proposed as a metaphorical description of social interaction, nor as a competing empirical model to existing sociological or network-based approaches. Instead, social spacetime is introduced as a geometric foundation within which such models can be situated. Before we measure or observe social behavior, there already exists a structure of constraints that shapes what kinds of movement are possible. Network models, field theories, and behavioral dynamics may be understood as local approximations or projections within this geometry, rather than alternatives to it. This work does not aim at immediate prediction, instead, it develops a structural language that brings diverse social phenomena under one geometric framework.

This framework is intended to describe structural constraints on social movement rather than to predict individual outcomes.

Relation to Existing Models

While this framework shares surface language with prior work on social space, stratification, mobility, and network structure, it does not operate at the same analytical level as those traditions. Existing approaches typically model social position as discrete categories, relational ties, or statistical outcomes, whereas social spacetime concerns the underlying structure that shapes which movements, connections, and transitions are possible in the first place. Rather than modifying or extending existing models, this framework provides a geometric description of social structure that is logical prior to measurement, classification, or empirical outcome. Its purpose is not to replace established approaches, but to offer a unifying structural language for understanding constraint, motion, and transformation across social contexts. Social

spacetime doesn't contradict well-established discrete or network approaches; rather, those models can be viewed as local projections or approximations within the broader field of social spacetime.

Existing approaches to social change and interaction typically represent social structure using networks, agent-based rules, or statistical regularities. Network models capture patterns of adjacency and connectivity but do not provide a continuous field in which motion itself is constrained or redirected by curvature. Agent-based models simulate local interactions and behavioral rules, yet lack a global geometric structure that shapes trajectories beyond those rules. Statistical and diffusion-based models describe aggregate flows and distributions, but do not encode how social environments deform the space of possible movement available to individuals.

To our knowledge, no existing framework models social systems as a continuous spacetime whose curvature directly constrains trajectories through social environments. The social spacetime framework is introduced to address this gap by treating social influence, constraint, and opportunity as geometric properties of a field rather than as isolated interactions or probabilities. This change in perspective makes it possible to ask how movement is constrained, where social gravity wells form, and why some paths are locally available but globally unreachable. These are questions that existing approaches, struggle to express. Unlike social geometry and field theories that locate actors within multidimensional social spaces, social spacetime formalizes the geometry of constraint itself. Rather than positioning actors within a space, it describes how the space bends, narrows, and reorganizes, shaping which trajectories are possible before actors select meanings or strategies.

While many social theories describe influence, power, and constraint in qualitative or relational terms, they typically lack a unified geometric framework in which constrained motion, trajectories, and structural narrowing of possibility can be explicitly represented. Essentially, existing theories describe social constraint, but rarely specify the geometry of the space that produces it.

Viewing social structure as a field of constraints helps explain several familiar social patterns. It shows why working harder does not reliably produce better outcomes, why influence and ideas tend to move through limited channels, and why social mobility can fail suddenly rather than decline slowly (talked about later in this paper). These patterns are often blamed on individual choices, but they arise from changes in how opportunities are structured. By focusing on which paths are open or closed, the framework highlights how structure shapes social movement.

Implications for Measurement and Application

This paper is explicitly theoretical and does not attempt empirical measurement. Its purpose is to define structural properties of social spacetime prior to observation or quantification. While no data are analyzed here, the framework is designed to be compatible with future empirical work by suggesting where constraints, boundaries, and transitions might be identified. Concepts such as network closure, institutional thresholds, or mobility barriers are not

measured in this paper, but are noted as examples of how the framework could later guide empirical inquiry without reducing social spacetime to any single metric.

Section 2: Motion and Curvature in Social Spacetime

This section describes how social gravity produces curvature in social spacetime, forming gravity wells that constrain or expand the trajectories available to social objects. These fabrics arise from the operation of the laws themselves and determine how motion is possible within a social fabric.

While various frameworks in sociology and network theory model social relations and influence as discrete interactions or localized structures, social spacetime provides a geometric substrate within which these models can be situated. By formalizing curvature, constraints, and trajectories, this framework offers a unifying structural language capable of capturing emergent patterns that existing approaches treat separately or approximate locally.

Social motion unfolds within and across social fabrics, each of which possesses gravity wells and regions of curvature. Each person has a personal social fabric that travels with them wherever they go, shaping how relationships, obligations, influence and risk are organized around them. Within social spacetime, we distinguish between social objects (such as people, contagions, and institutions) and social resources (such as oil, electricity, food, water, and fuel). These resources do not behave like social objects; instead, they contribute to the curvature of the surrounding social fabric, particularly during scarcity events such as the gas lines following Hurricane Sandy.

Curvature in a social fabric is never flat. It forms depressions, ridges, and wells of varying steepness—regions where motion becomes easier in some directions and harder in others. A person embedded in a steeply curved social fabric may find their available trajectories narrowed, as if moving along the slope of a gravity well. Conversely, shallower wells allow motion along multiple trajectories [figure 2]. The diagrams in this paper illustrate these structures as geometric descriptions of how social gravity shapes possible movement within and between social fabrics.

Figure 2. Social Trajectories of Social Spacetime

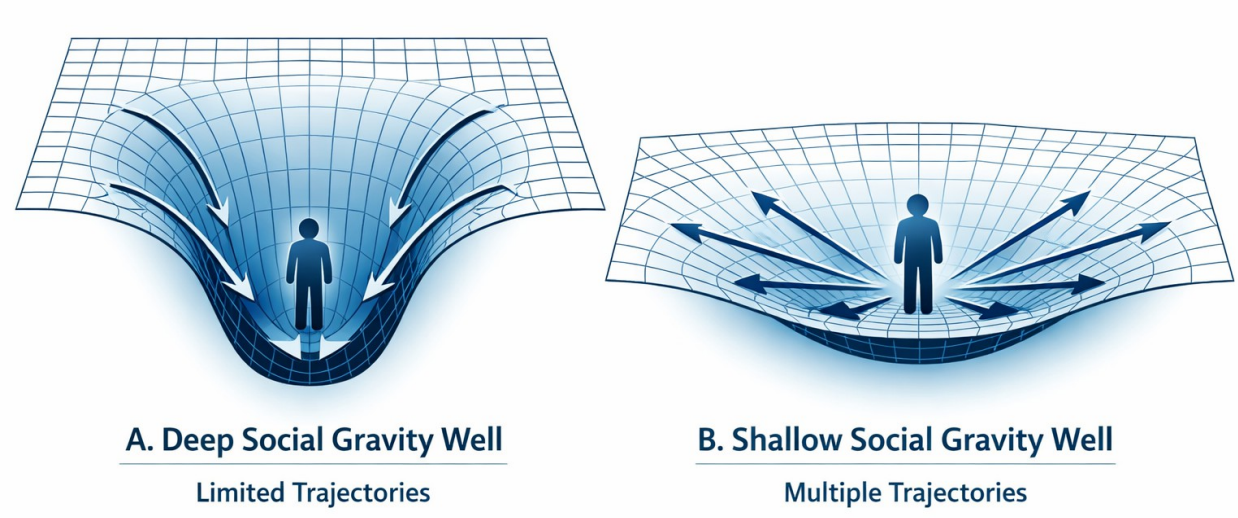

Figure 2 shows how social curvature constrains available trajectories.

Social motion occurs when a social object changes its position or orientation relative to the surrounding curvature of its social fabric. This may involve shifting relationships, forming or dissolving ties, changing roles, or moving between fabrics. When curvature becomes steeper—such as during threat, scarcity, or institutional (societal) breakdown—motion becomes more constrained, and trajectories tend to collapse into narrower pathways. A steep social gravity well corresponds to environments where exits are limited and deviation carries high cost, such as tightly regulated institutions. When curvature is comparatively shallow, a wider range of trajectories becomes available, allowing motion to spread outward rather than being drawn downward into a deep gravity well. No region of a social fabric, including areas surrounding social resources, is ever perfectly flat; every location exists within some degree of curvature, from shallow to steep.

Collisions occur when two or more social objects move along trajectories that bring them into direct interaction within a shared region of curvature. Collisions may strengthen a fabric, destabilize it, or reorganize it, depending on the local geometry of curvature. In some cases collisions produce deeper wells as fabrics merge; in others, they produce fragmentation, creating multiple smaller fabrics with new boundaries.

Reorganization occurs when the geometry of curvature within a social fabric changes such that existing trajectories are no longer sustainable. This may follow scarcity events, institutional failure, sudden accumulation of people, attention, or influence, or changes in resources that alter the distribution of curvature.

Reorganization is not random; it proceeds along the trajectories permitted by the geometry of the social fabric at that moment. The resulting structure may stabilize into a new configuration or remain dynamic if curvature continues to change.

Across all of these dynamics, social spacetime provides a continuous field in which different sources of social gravity shape curvature in distinct ways. Section 3 establishes the

geometric foundation for the five laws of social fabrics. These laws specify how different sources of curvature operate, constrain motion and influence trajectories, collisions, and long-term stability within and across social fabrics.

Section 3: The Laws of Social Spacetime

The curvature and pathways described in social spacetime emerge not randomly but through systematic forces that guide motion, concentration, and organization within fabrics. These forces are formalized as the five laws of social spacetime, which explain how unconscious, subconscious, and conscious social fabrics shape survival, social mass, goal pursuit, moral order, and, ultimately, the institutions that structure society. Understanding these laws allows us to move from description to a principled framework that clarifies how social objects and social resources behave across different regions of the fabric.

Figure 3. The Five Laws of Social Spacetime

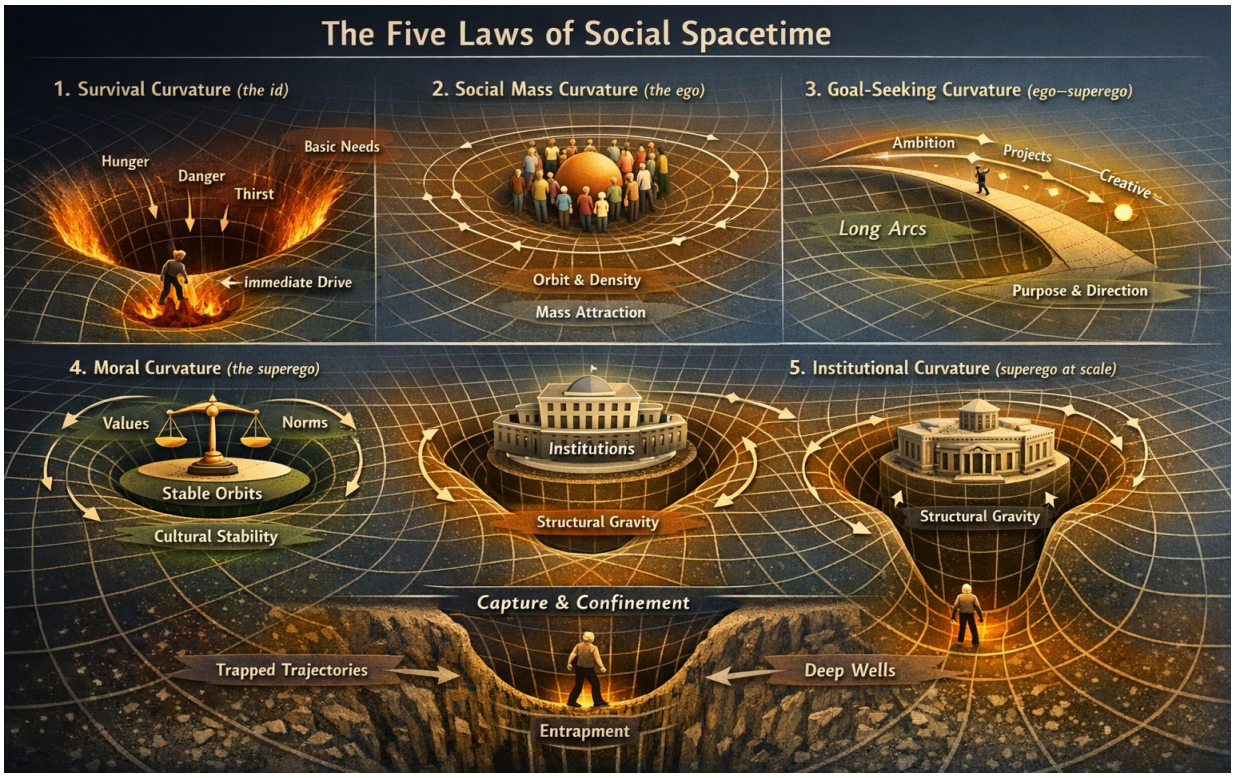

Figure 3. The characteristic curvature generated by the five laws of social fabrics, shows how survival, social mass, goal-seeking, moral and institutional curvatures differently shape the structure of social spacetime and constrain possible trajectories of social motion.

The five laws of social spacetime (figure 3) govern how social objects form, interact, and stabilize across unconscious, subconscious, and conscious layers of social life. They are: (1) survival mechanisms, arising from the id and reflecting instinctive threat-avoidance and security drives; (2) social mass, which spans the id and ego and shapes the accumulation of people, contagions, recognition, attention, and coordination; (3) goal seeking, an ego-driven system

organizing deliberate trajectories and strategic action; (4) morals and values, arising from the superego and guiding behavior through shared expectations of what is acceptable or forbidden; and (5) institutions, large-scale structures that accumulate and preserve the effects of the first four laws across generations. Together, these laws bend social spacetime, channeling trajectories, concentration social mass, regulating behavior, and stabilizing the structures that make social worlds intelligible.

The laws do not function as external moral rules. They are emergent field dynamics observable wherever social objects interact, concentrate, or align within a shared social fabric.

Law 1 - Survival Mechanisms (the id)

Each of the laws of social spacetime contributes to the structured geometry of the social field, defining the conditions under which social fabrics possess curvature rather than remaining flat.

The first law originates in the id's drive for safety, trust, security, immediate need-satisfaction, and risk avoidance. Social objects act to preserve access to resources, protection, and belonging, even when those actions destabilize broader structures. Wherever survival imperatives intensify, the social field curves sharply: movement narrows, options contract, and trajectories are pulled toward behaviors that minimize threat.

Regions governed primarily by survival instincts produce steep gravity wells. In regions of steep social curvature (strong survival pressures, high stakes, or scarcity), social actors compete more aggressively. Essentially, social tension rises and groups become more protective of themselves. In these regions, fabrics remain intact only so long as survival interests align across members.

Law - 2 Social Mass (the id and ego)

Following the foundational geometry, the second law governs how curvature narrows the range of possible trajectories.

Social mass emerges when people gather and remain coordinated around a person, role, idea, or contagion. While people constitute the mass itself, shared attention, recognition, and participation provide the organizing focus that holds that mass together. The id is drawn toward concentrated mass for safety and reassurance, while the ego orients to it as a site of coordination, influence, and opportunity. As social mass increases, the surrounding fabric curves inward, creating gravitational centers that attract additional people and stabilize patterns of behavior.

High-mass regions restrict motion and define dominant trajectories; low-mass regions remain shallow, flexible, and permissive. The distribution of mass across the fabric determines which actors hold structural leverage and which remain marginal to the field.

Law – 3 Goal Seeking (the ego)

With the geometry established, the third law governs how objects traverse curved regions,

following paths shaped by local gradients rather than free choice.

The ego organizes intention, planning, and directional movement through the fabric.

Under the law of goal seeking, social objects orient along trajectories aligned with intended outcomes—achievement, influence, advancement, or transformation—adjusting motion through the curved fabric accordingly. Goal seeking straightens some pathways and blocks others, guiding motion through regions shaped by opportunity, constraint, and strategic alignment.

Where many overlapping goals *converge*, curvature intensifies: competition, coordination, and negotiation reshape the field. Where goals fracture or conflict, strain accumulates and the stability of the fabric weakens.

Law – 4 Morals and Values (the superego)

The fourth law addresses *interaction*, describing how mergers and separations between social objects modify local curvature and reorganize the surrounding fabric.

The fourth law addresses interaction, describing how social objects are drawn together, redirected, or separated through curvature-mediated influence, reorganizing the surrounding fabric without direct value collisions. Law 4 effects *paths*, not values.

Moral alignment reinforces cohesion and supports stability; moral fracture modifies local curvature, producing regions of concentrated constraint or marginalization. The stability of a fabric depends not only on power and resources, but on whether its value structure remains internally coherent. In social-spacetime terms, power equals curvature-producing capacity. *Power*, is the capacity of a social object to reliably shape the trajectories of other social objects within a fabric.

Law – 5 Institutions (large-scale structures)

At large scales or societal scales, the fifth law describes how accumulated social curvature can force a social fabric to reorganize or break down. A fabric may remain stable for long periods as curvature builds, then suddenly shift when existing structures can no longer sustain the strain placed on them. When this happens, patterns of constraint and movement are rapidly reconfigured at the system level, without any single individual directing the change. These large-scale shifts reflect the combined influence of survival pressures, goal-directed action, and moral regulation acting across the fabric as a whole.

Over time, repeated interactions solidify into durable, large-scale structures such as economies, governments, legal systems, markets, housing regimes, educational systems, and bureaucracies. These institutions embody the accumulated effects of the survival, mass, goal-seeking, and moral value systems over time. Once formed, they exert their own gravitational pull, bending the field even when individual intentions change.

Institutions (societal structures) stabilize trajectories by standardizing roles, codifying expectations, and concentrating mass at scale. At the same time, they can lock curvature in place, rendering fabrics resistant to adaptation and vulnerable to rupture when accumulated strain exceeds their capacity to reorganize.

Interdependence of the Five Laws

None of these laws operates independently. Survival drives feed the accumulation of social mass. Mass enables goal pursuit, which is bounded by moral order. The accumulated effects of these four processes eventually crystallize into institutional (system) form [figure 4]. When alignment holds, curvature stabilizes and the fabric persists. When the alignment breaks down, curvature imbalances propagate through the system, setting conditions for fragmentation, collapse, or large-scale reorganization.

Figure 4. A Comprehensive Look at Social Spacetime

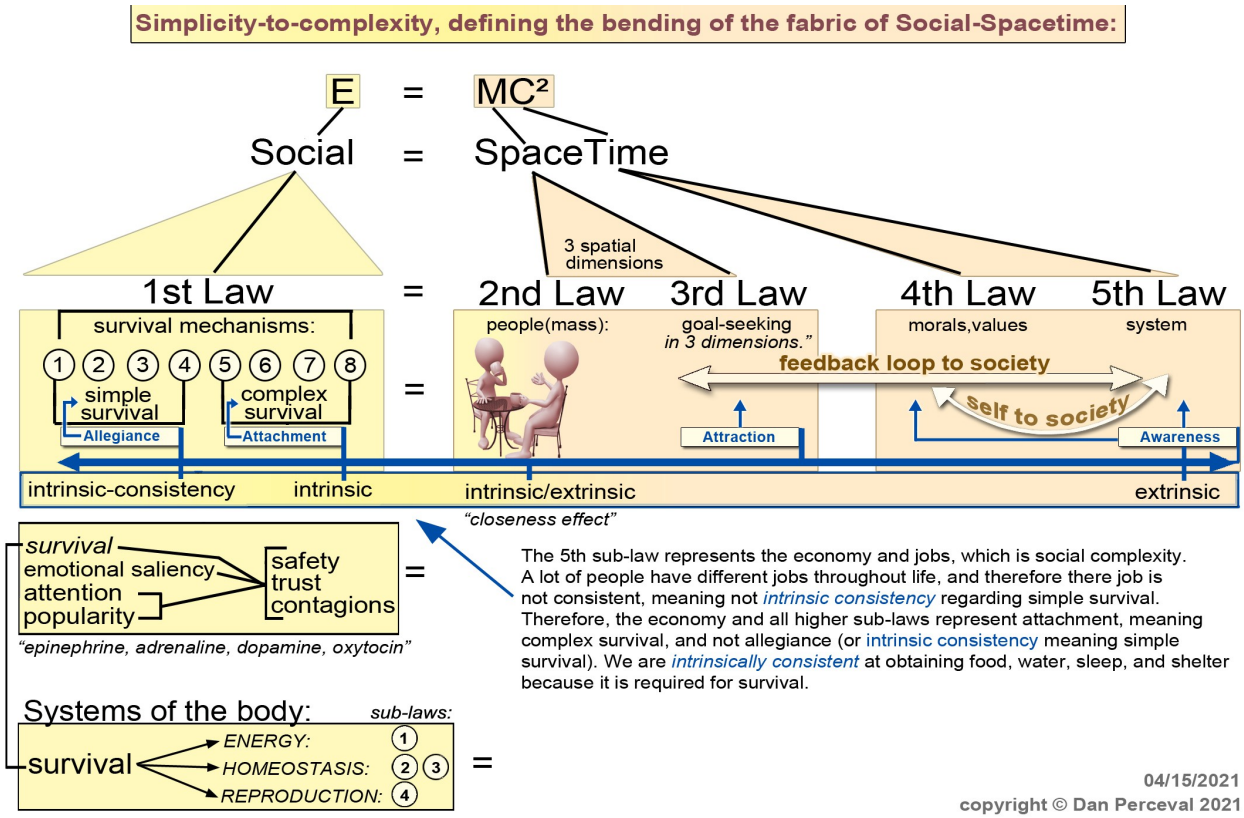

Figure 4. A comprehensive diagram of social spacetime shows how survival, mass, goal-seeking, moral, and institutional fabrics combine to shape trajectories, orbits, and patterns across the social fabric.

Operationalizing Social Spacetime

While the social spacetime framework is presented at a conceptual level, it can be operationalized through concrete applications that demonstrated how curvature, social gravity,

and trajectories constrain motion within social environments. The purpose of this section is not to provide empirical validation, but to show how the framework can be used to reason about real social dynamics in a structured and non-metaphorical way.

Example 1: Moving Up in a Tight-knit Group

Step 1: Identify the social environment

Imagine someone trying to become more influential in a small, close-knit office or friend group. Positions of influence are limited, social roles are already established, and nearly everyone knows everyone else. The social fabric is dense and highly interconnected.

Step 2: Describe the constraints

This environment contains strong norms, shared history, and well-defined expectations. Deviations from established roles are quickly noticed. Because interactions are repeated and visible, small missteps can produce disproportionately large consequences. Informal sanctions—lost of trust, social distancing, or reputational damage—are easily triggered.

Step 3: Explain constrained behavior

Social spacetime explains this problem by treating the overlapping norms and role expectations as regions of high curvature. Attempts to move “upward” do not proceed in straight lines. Instead, proposed ideas, behaviors, or bids for influence are deflected along existing channels. Some directions of movement are effectively blocked, while others are reinforced. Influence accumulates only along trajectories that conform to the local curvature of the group, rather than through unrestricted action.

Example 2: Ideas Moving Through Overlapping Communities

Step 1: Identify the social environment

Consider an idea originating in one community—such as a professional network, online forum, or cultural group—that partially overlaps with others. Individuals may belong to multiple communities simultaneously, creating shared boundary regions.

Step 2: Describe the constraints

Each community has its own norms, language, and evaluative standards. As an idea moves across boundaries, it encounters resistance, reinterpretation, or selective amplification. What is valued in one region may be neutral or even penalized in another.

Step 3: Explain constrained behavior

In social spacetime, these overlapping communities created uneven curvature across regions. The idea's trajectory bends as it moves, accelerating in some areas while slowing or

fragmenting in others. Rather than spreading uniformly, the idea follows curved pathways shaped by compatibility between local structures. This accounts for why ideas often mutate, stall, or re-emerge in altered forms as they traverse social boundaries.

Example 3: Sudden Loss of Mobility After Structural Change

Step 1: Identify the social environment

Imagine an individual operating within an institution—such as a company, platform, or academic field—that undergoes rapid reorganization. Formal rules change, roles are redefined, or gatekeeping mechanisms are introduced.

Step 2: Describe the constraints

Paths that were previously open—promotion, participation, visibility—are abruptly narrowed or eliminated. The individual's past trajectory no longer aligns with the new structure, even though their behavior has not changed.

Step 3: Explain constrained behavior

Social spacetime interprets this as a *structural transition* rather than individual failure. A *structural transition* occurs when accumulated curvature in a social fabric passes a critical threshold, such that the existing configuration of gravity wells and trajectories can no longer be maintained, forcing the fabric to reorganize into a new geometric structure. The curvature of the environment has changed, altering which trajectories are possible. Motion that once required little effort now encounters steep resistance. This explains sudden stagnation or exclusion without attributing it to loss of competence, motivation, or intent.

What These Examples Demonstrate

Across all cases, social spacetime provides a way to reason about patterned social outcomes by focusing on constraint, curvature, and trajectory rather than isolated choice. The framework also explains why working harder doesn’t reliably lead to better results, and why influence and ideas move through limited channels.

In social spacetime, the Great Recession represents a *structural transition* in which accumulated curvature in the financial–housing fabric crossed a threshold, causing many mobility trajectories to collapse simultaneously [figure 5]. Once one major node fell, the geometry of the entire fabric reorganized, triggering cascading failure. The Great Recession illustrates how social mobility can collapse through a structural transition in social spacetime. As financial institutions accumulated social mass and curvature concentrated within the housing fabric, mobility appeared stable but fragile. When a major institutional object lost mass, curvature redistributed abruptly, causing multiple mobility trajectories to vanish simultaneously. This produced cascading failure across financial and housing fabrics, not through behavioral contagion, but through geometric reorganization of the social field. The housing market and large financial institutions accumulate social mass through leverage and interdependence, generating

steep curvature in economic social spacetime. As curvature increases, available trajectories for households, firms, and institutions narrow, producing a systemic credit shock. Once a structural threshold is crossed, motion is drawn into a collapse region, resulting in widespread foreclosures, bank failures, and economic contraction. Figure 5 emphasizes structural constraint rather than quantitative scale.

This is why it looked like a house of cards. Mobility is about *where motion is possible*, not merely where an object is located.

These examples show how social spacetime functions as an analytic tool: not as metaphor, but as a structured way to describe how social environments shape motion within them. Although developed at a conceptual level, social spacetime is intended as an analytic geometry for reasoning about real social systems. In social spacetime terms, it shows that the crash wasn't just a sequence of bad decisions, it was a structural gravity well forming across coupled systems.

Figure 5. Social Spacetime of Economic Collapse

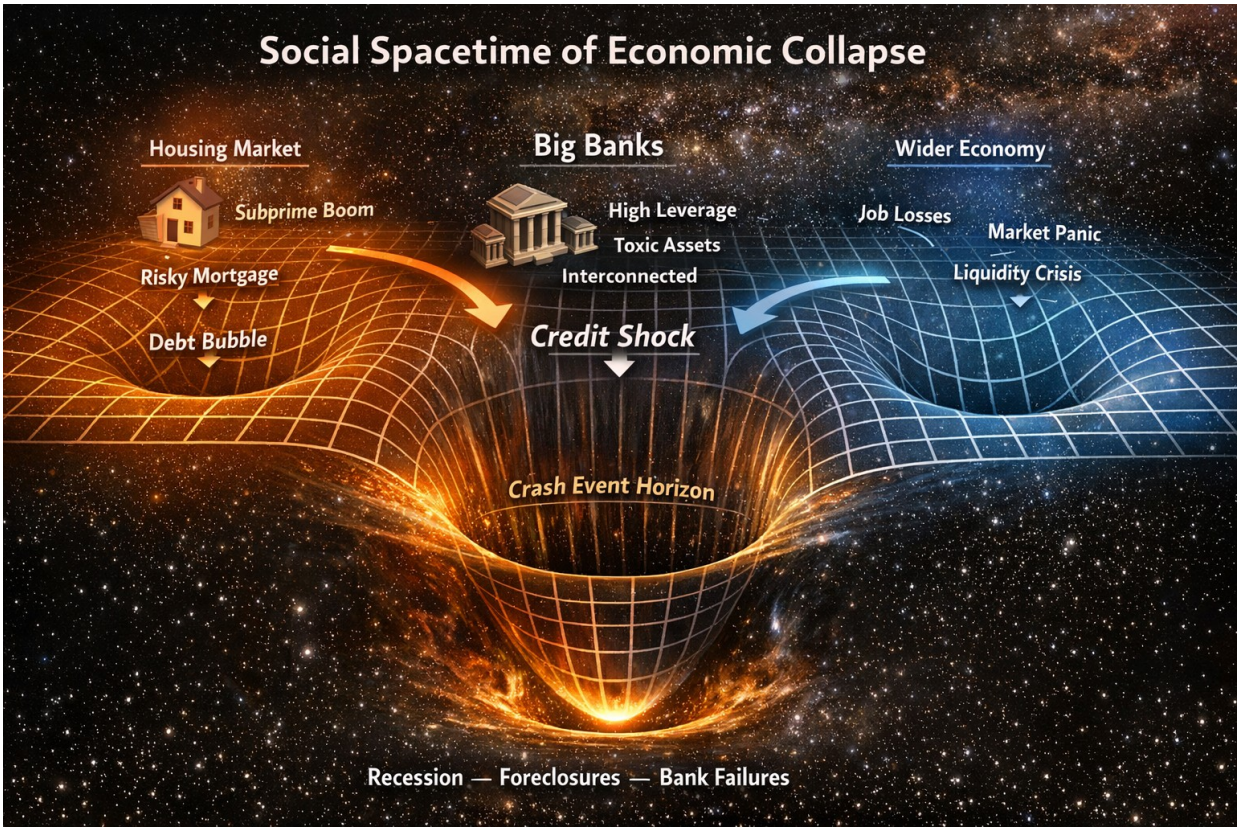

Figure 5. This image models social spacetime under the Great Recession

Scope and Limitations

This paper presents a theoretical framework and does not yet claim empirical measurement. Curvature is a descriptive property of social fabrics, not a moral claim or a force that dictates outcomes. It is intentionally foundational, establishing the structural geometry of

social fabrics. Empirical validation, simulation, and predictive modeling are appropriately reserved for future computational implementations of the framework. Future work could formalize metrics or simulations.

Conclusion:

The five laws together reveal the deep structure of social fabrics, showing how curvature shapes patterns of behavior, interaction, and organization as they bend, concentrate, and flow across unconscious, subconscious, and conscious social fabrics. They explain why fabrics form stable shapes, why trajectories curve or cluster in specific regions, and why sudden shifts can occur without any single individual controlling them. Over time, survival pressures, social influence, goal pursuit, and moral values solidify into institutions that embed these dynamics in lasting structures. The laws therefore expose the underlying architecture of social life, explaining how structural curvature shapes cohesion and change in complex social systems.

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