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Mechademia, Volume 7, 2012, pp. 191-201 (Article)

Published by University of Minnesota Press



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## Topologies of Identity in *Serial Experiments Lain*

The problem or issue of human identity is a recurrent theme in anime, manga, and science fiction in general. From the dipolar identity of Dr. Jekyll and Mr. Hyde to the indefinite iterations of the Eternal Champion in the multiverse of Michael Moorcock, the precise nature of what constitutes a human, and the form in which that humanity is manifested, remains unsettled. The potential for human-machine interface provides an additional dimension to the problem. External memories and digital avatars allow for the possibility that a human might live in a machine.<sup>1</sup> Conversely, biomechanical hybridization and cybernetics imply that a machine might live in us.<sup>2</sup> This human-machine interface, in all its various forms and ramifications for human identity, is the frontier that many anime and manga series navigate. One particularly intriguing series in this vein is *Serial Experiments Lain* (1998).

*Lain*, the anime, is intriguing for its exploration of identity as a construct without a fixed or unambiguous location. As an entity, Lain, the character, is shown to simultaneously exist in many places—at home, at Cyberia, at Arisu's, in the Wired—and in many modes—diffident, ebullient, pernicious, assertive. Eventually, however, Lain becomes aware of these simultaneous identities. And they may, indeed, be viewed as simultaneous. They need not

result from a split identity, in the manner of a Dr. Jekyll one moment and a Mr. Hyde the next. Nor are they necessarily mere aspects of Lain, or more precisely, incomplete parts that only in sum constitute a whole. In one of Lain's trips to the Wired, Eiri Masami tells her, "Another you has always existed in the Wired."<sup>3</sup> This is difficult for Lain to accept, however: "I'm me, right? There's no other me but me, right?"<sup>4</sup> For Lain to believe otherwise would contradict the notion of a unitary localization of identity: namely, that at a specific point in time, human identity exists at a specific point in space. Identity, for Lain, needs distinct coordinates, a way to situate oneself uniquely among the grid-lines of existence: "As long as I am aware of myself, my true self is inside me."<sup>5</sup>

It is hard to see this statement as anything other than a spatial corollary of the *cogito ergo sum*, to wit: "I think, therefore I am . . . at this precise time and place." This is Cartesian geometry applied to Cartesian philosophy, with Lain fixing her identity at the origin.

## CIRCLES IN THE SKY

By any measurement, the analytical geometry of René Descartes must be counted among humanity's most enduring achievements. It is a system by which a single point, chosen arbitrarily, radiating measured orthogonal lines, suffices to coordinatize a space, turning continuous, amorphous curves and regions into discrete sets of equations. Coordinate geometry was the essential ingredient in the calculus of Isaac Newton and Gottfried Leibniz, and its usage today remains undiminished by time or fashion. From the trajectories of satellites to computer-generated imagery, the influence of Cartesian geometry is pervasive.

A by-product of Descartes's formalism, however, is the persistent, reinforced notion that all local properties of a universe may be extended globally. This notion assumes that, since any given locality may be situated within a Cartesian frame, then there must also exist a coordinate frame for the entire universe. I say "reinforced" because the notion of a universal unambiguous measurement of space relative to a solitary fixed point did not originate with Descartes. Indeed, the need for a linear ordering of our perception of the universe (and simultaneously, our position in its hierarchy) may be witnessed, for instance, in the concentric orbits of the Ptolemaic geocentric theory, developed nearly 1500 years before Descartes (Figure 1).

The cycles and epicycles of this system provide a universal order from Earth to Empyrean. It is a coordinate system for all creation.<sup>6</sup> But while the

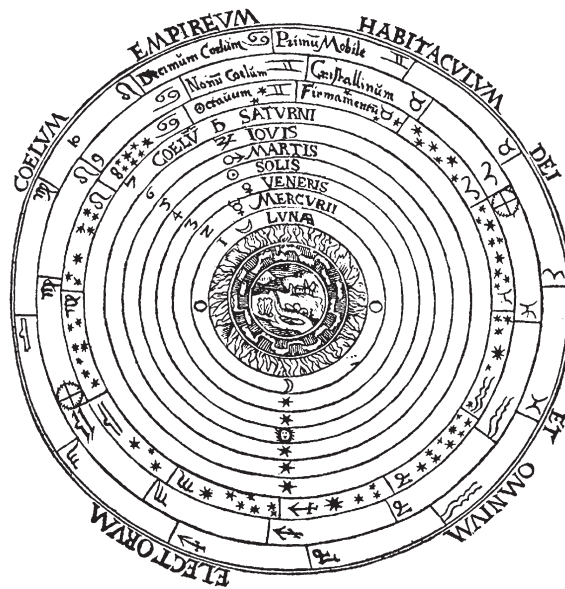


FIGURE 1. The Primum Mobile as depicted in Peter Apian's *Cosmographia* (Antwerp 1539), reprinted in Edward Grant, "Celestial Orbs in the Latin Middle Ages," *Isis*, 78, no. 2 (June 1987): 152–73.

geocentric model eventually fell to heliocentrism, which in turn eventually fell to the view that the universe has no “center” whatsoever, the universal sense of certainty with respect to place that the geocentric model engendered persisted within the coordinate geometry of Descartes and the simple physical laws of Newton. Indeed, coordinate geometry not only allowed for precise measurement in space but also in time, for time was made to be just another coordinate.

From this confluence of Newtonian and Cartesian theories, there arose the notion of a deterministic universe: if the universe is such that the grid of a Cartesian system gives unique coordinates to all points in the universe, then a knowledge of the initial coordinates of all particles and their momenta, in combination with a handful of concise equations expressed in these coordinates, will give a complete knowledge of all future states of the universe.<sup>7</sup>

Leaving aside the philosophical ramifications of such determinism, we may nevertheless wonder: what if the universe was not coverable by a single, unambiguous Cartesian system? This is not, in fact, idle speculation. The question of the “shape of the universe” is far from settled. The universe might, indeed, continue on infinitely with perfect regularity, but it might also

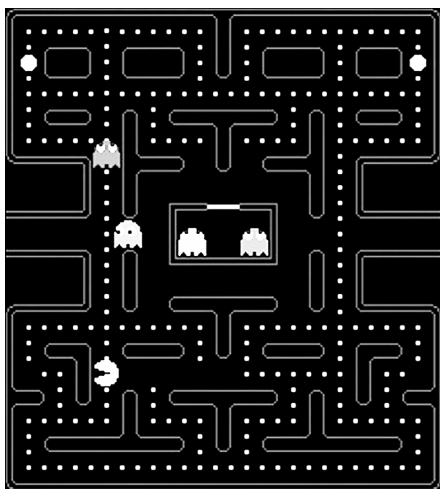
HE WOULD LOOK OFF  
INTO THE DISTANCE  
AND SEE . . . HIMSELF.

curve back on itself in endlessly complicated ways, twisting into higher dimensions in such a way that no fixed origin will suffice to completely or unambiguously identify all points in space. That is to say, our local perception of our universe may not be globally extensible—and to imagine otherwise would be as mistaken as the proto-belief that the Earth is a flat disk.<sup>8</sup>

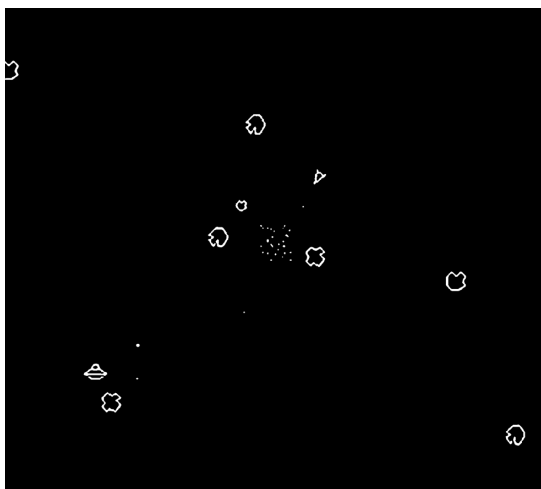
Topology is the branch of mathematics in which the issue of global versus local properties of a space is best understood. Topology should be distinguished from geometry in that topology considers only those properties of a space that are, in a sense, invariant under deformation. So, for instance, a sphere and a cube are topologically identical, whereas they are geometrically distinct.

Several examples-by-analogy present themselves in the form of early 2D arcade games. The universe of *Pac-man* (1980, *Pakkuman*), for instance, is a finite Cartesian patch with one set of opposite sides glued together. That is, passage through the left side of the screen leads to entrance from the right. This is accomplished without teleportation or other exotic forms of transportation.<sup>9</sup> From Pac-man's point of view, there is no distinction between the left edge and the right edge. They are identical. As such, the universe Pac-man inhabits is a cylinder (Figure 2). This identification, *left = right*, leads to ambiguity in any attempt to impose a Cartesian system on the *Pac-man* universe, since any single point must be identified by several (in fact infinitely many) distinct sets of coordinates.

The Atari game *Asteroids* (1979) is worse yet. In this bleak universe, both sets of parallel edges are joined: left-to-right and top-to-bottom. Who would have guessed that the little besieged ship inhabited a toroidal universe?<sup>10</sup> The question of perception in these non-Cartesian universes is an interesting one. Indeed, if Pac-man paused in his activity long enough to look through the corridor joining the left part of the screen to the right, his view would not open onto limitless space but rather onto the finite world he currently inhabits. As such, he would look off into the distance and see . . . himself. And further on there would be yet another image of himself, and so on. It is like the infinite multiplicity of identity created by situating oneself between two parallel mirrors, except that this multiplicity is an artifact of a finite universe rather than endless reflection. For the lonely Sisyphean cosmonaut of Atari's *Asteroids*, the view is even more chaotic. Any attempt to look any farther than her immediate vicinity, in any direction at all, will reveal limitless images of herself, from slightly different angles and at increasingly distant times.<sup>11</sup>



**FIGURE 2.** Screenshot from *Pac-man* (*Pakkuman*), Midway/Namco, 1980. The two-dimensional Pac-man universe is topologically a cylinder.



**FIGURE 3.** Screenshot from *Asteroids*, Atari, 1979. This universe is finite and unbounded in all directions. Topologically, it is a “torus” or doughnut.

Many higher dimensional analogues of these non-Cartesian spaces are known to exist, and the scientific community is actively seeking to discover if our universe is among them. Several satellites have been launched to map the cosmic background radiation that pervades the universe.<sup>12</sup> Images of this radiation represent a convergence of photons from all directions at a single “point” (the satellite’s photo-receptor plate). Allowing time to run in reverse, these photons “expand” in a sphere of ever-increasing radius until they return to a state called the “surface of last scatter,” roughly 380,000 years after the Big Bang, at which time the universe had cooled enough to allow matter and radiation to decouple. This surface of last scatter is a topological sphere. If the universe were finite (or non-Cartesian in a way similar to what has been described), and sufficiently small, then the surface of last scatter will self-intersect. This self-intersection would subsequently reveal itself,<sup>13</sup> a billion years later, as circles of radiation with identical temperature distribution in distinct parts of our sky.

## INTERFERENCE PATTERNS

The topology of a finite, non-Cartesian universe precludes the use of unique coordinates to reference the position of its inhabitants. Indeed, the topology of such a universe invariably creates infinite virtual duplicates. In their

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scientific paper, "Circles in the Sky: Finding Topology with the Microwave Background Radiation," Cornish et al. discuss this potential phenomenon: "In a multiply connected universe, many null geodesics start from the position of an object and reach the present observer. Thus there will be many images of each object, often called ghosts."<sup>14</sup>

Of course, virtual duplicates ("ghosts") are also precisely what Lain encounters more and more frequently as she moves from reality into the Wired. As such, one wonders if there might be a topological aspect to this ambiguity of identity confronting Lain. Could there be a sense in which these copies of Lain are explicable not as incomplete scraps of a single fragmented identity but as distorted images of herself received across a universe of noise?

Or perhaps by moving from the real world to the Wired, from solitariness to increased socialization, Lain's expansion into her universe is actually bringing her into contact with herself. Like an expanding sphere of photons in a finite universe, self-intersection at the margins is inevitable. And with this self-intersection comes self-interaction. In one such self-interaction, Lain confronts her duplicate, saying, "Who are you? You're not me."<sup>15</sup> To which her image replies, "Hey, I'm Lain, aren't I?" Significantly, she does not say, "I am a part of Lain," or "I am like Lain," but rather, "I am Lain." Of course, this apparent contradiction is a source of anxiety. But it is a contradiction only insofar as Lain persists in holding on to a Cartesian view of her universe.

Lain's universe, however, becomes progressively less and less Cartesian. At one point we are shown an infinite regression of Lains, an infinite regression identical to what a far-sighted Pac-man would see (Figure 4). "What are these things?"<sup>16</sup> she asks. To which Eiri answers, "They are all you."

The multiplicity of identity is unmistakable in *Serial Experiments Lain*, and many authors have commented on it. One excellent example is the manga essay, "The Signal of Noise" by Adèle-Elise Prévost.<sup>17</sup> Prévost analyzes the multiple identities of Lain in terms of Lain-as-software. The multiple versions of Lain we see in the series are a "delocalization of identity," caused by the separability of the digits that make up the entirety of Lain's body and world. Lain-as-software is a computer program, broken into various packets, processed in parallel, which can only be considered whole or complete upon some future reassembly. As a fully digitized identity, Lain is susceptible to the bit-processes of all digital information: duplication, corruption, deletion.



**FIGURE 4.** Screenshots from *Serial Experiments Lain*, episode 8: "Rumors." Lain observes an endless regression of Lains.

This mode of analysis evokes, perhaps accidentally, a new topological paradigm of its own—namely, that of the network or graph: a finite set of nodes joined together by edges. This is an essentially discrete space that is non-Cartesian in the sense that there is no unambiguous notion of distance, even locally.<sup>18</sup> What matters most in such a space is the connectivity or nonconnectivity of nodes, and two nodes that might be very far apart by one route

can be very close by another. This is the discrete analog of a continuous space wrapping back around on itself. In a universe composed of nodes and wires, the difference between local and global topologies lies merely in the scale of their complexity. However, with increased complexity comes increased ambiguity with respect to distance. Widely distributed subroutines may eventually compete for the same resources. In this way, a digital being in a wired universe may unexpectedly collide with itself. Further, such self-collisions—if that is what Lain's multiple images actually are—must invariably give Lain the occasion to effectively change herself. Like a wave pattern that is allowed to self-overlap (as if dropping a pebble in a toroidal pond), superposition leads to constructive and destructive patterns of interference. Only, for Lain, given that she exists in a wired universe, the processes that lead to self-interference are digital: time sharing, queuing, stacking.

A wired universe is finite and must always be, but in a different way than the finite *Pac-man* universe. A discrete space is finite both in terms of distance and in terms of cardinality as well, because it is limited by the number of nodes available and by the clock cycle that regulates information sharing.<sup>19</sup> Indeed, in such a universe, there can be only a finite number of beings. And what distinguishes them from each other is not their content (0s and 1s), but some larger structure by which this content is arranged. Lain often finds herself wondering, "What's the other me doing?" Inside a digital universe, there are only a finite number of possibilities.

On the other hand, there is a sense in which the Cartesian notion of the singularity of identity may still be in effect in such a digital universe. This is because identity in such a universe, delocalized though it may be, can only be conceived in terms of permutations of digits. It is a universe whose beings are fragmented, formed of bits and pieces, but who nevertheless orbit a fixed, if unknown, origin.

## TOPOLOGICAL COLLAPSE

In considering the ambiguity of identity depicted in *Serial Experiments Lain*, it is important to understand the nature of the universe in which these identities can be said to exist. Consequently, topological considerations can be useful for considering the nature of the identities themselves. *Lain* is not the only text that is amenable to such considerations. *Neon Genesis Evangelion* (1995, *Shin seiki evangerion*) also depicts characters with multiple simultaneous instantiations. In Episode 16, while trapped in the entry plug of his Eva,

Ikari Shinji confronts another version of himself who tells him, “There are many Ikari Shinjis. The one in your mind, the one in Katsuragi Misato’s mind, the one in Soryu Asuka’s mind, the one inside Ayanami Rei’s mind . . . Each of them are different, but they’re all Ikari Shinji.”<sup>20</sup> Moreover, the Human Instrumentality Project at the end of the series is nothing short of a spectacular topological collapse of identity. The AT fields of all human beings are broken, allowing the physical essence of human identity to merge into a single field. With this, we witness the reduction of the entire universe of human identity to a topological space consisting of a single point: a degenerate Cartesian space of dimension zero.

For Lain, there are several ways in which a topological analysis can help in understanding and interpreting her apparent multiplicity of identity. By thinking of Lain as an expanding identity in a finite closed universe (discrete or continuous), we allow for instances of self-intersection. Additionally, in such universes, the existence of multiple geodesics joining two points together leads to distorted “ghost” images and singularities of apparent ambiguity. These topological considerations need not compete with the purely digital conception of identity presented by Prévost. Indeed, an analysis of identity in *Serial Experiments Lain* via artifacts of digitization naturally leads one to consider the topological implications of existence in a finite wired universe.

In the end, Lain’s persistent question—“Where is the real me?”<sup>21</sup>—is answered, as in *Evangelion*, by locating identity in the minds of others: “There is no real me. I only exist inside those people who are aware of my existence.”<sup>22</sup> And, in fact, Lain achieves her own version of topological collapse by subsuming her remaining images, removing herself from the world and the minds of her friends, leaving only a final grainy image of herself on a handheld Navi as evidence of her existence.

But, in fact, this final image is not the only evidence of Lain’s existence. Arisu remembers Lain, if only instinctively. Hence, Arisu’s final comment, “If you don’t remember something, it never happened,”<sup>23</sup> is ultimately never completely put to the test.

The final topology of Lain’s identity remains unclear. Has she retreated deep into the Wired, or to some other universe beyond the Wired? Is her final identity confined to a kernel of memory in Arisu’s mind? Whatever the answer to these and other questions, we should keep in mind that when discussing the issues, problems, and representations of human identity, the spaces in which these discussions take place might be more complex than they seem.

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## Notes

1. Examples of both can be found, for example, in the *.hack* series, particularly the anime *.hack//Sign* (2002, dir. Mashimo Kōichi); 6 DVDs (Bandai, 2003–4), and the *Ghost in the Shell* series, beginning with the movie *Kōkaku kidōtai* (1995, dir. Oshii Mamoru); translated as *Ghost in the Shell*, DVD (Manga Entertainment, 1998).
2. See, for example, *Tekunoraizu* (2003, dir. Hamazaki Hiroshi); translated as *Texhnolyze*, 6 DVDs (Pioneer, 2004–5).
3. *Serial Experiments Lain*, dir. Nakamura Ryutarō, TV series, 13 episodes (1998); 4-DVD box set (Geneon [Pioneer], 2001), Ep. 8: “Rumors.”
4. Ibid.
5. Ibid.
6. Although the theological implications of this ordering were vigorously pursued by the Catholic Church in the Middle Ages, the ordering itself is classical. See for example the sixth book of Cicero’s *De re publica* (54–51 BCE, On the commonwealth) in which Scipio Aemilianus dreams of ascending through the heavens, observing the geometry of the celestial spheres, where, “in the center, the ninth of the spheres, is the Earth, never moving and at the bottom” (73). Marcus Tullius Cicero, *De re publica* VI.iv.3, in Macrobius, *Commentarii in Somnium Scipionis*, translated by William H. Stahl as *Commentary on the Dream of Scipio by Macrobius* (New York: Columbia University Press, 1952).
7. This view is elegantly summarized in Tom Stoppard’s play, *Arcadia* (Boston: Faber & Faber, 1993): “If you could stop every atom in its position and direction, and if your mind could comprehend all the actions thus suspended, then if you were really, really good at algebra you could write the formula for all the future; and although nobody can be so clever as to do it, the formula must exist just as if one could” (9–10). In fact, if in this “formula for all the future” we replace *t* (time) with *-t*, we are able to run time backward and recover the past as well.
8. Many ancient cultures conceived of the Earth as flat. It is a widespread misconception, however, that this view lasted into the Middle Ages. In fact, the *Commentary on the Dream of Scipio* by Macrobius (see note 6) was a primary reference for medieval European scholars on many matters of cosmology.
9. Many advanced forms of transportation in science fiction are topological in nature: hyperspace, wormholes, singularities, and so-called tears in the “fabric of space.” One in particular I find notable is the ability of the Guild Navigators, in Frank Herbert’s novel *Dune* (Philadelphia: Chilton Books, 1965), to “fold space” and therefore “travel without moving.”
10. For more current examples of creative use of topology in video games, see *Portal* and *Portal 2* (Bellevue, Wash.: Valve Corporation, 2007, 2011).
11. Since the speed of light is finite, all “distant” images will display past events.
12. Among these satellites is the Planck space observatory, launched in 2009 by the European Space Agency, and NASA’s Wilkinson Microwave Anisotropy Probe (WMAP), launched in 2001.
13. For an accessible introduction to these topics, see Jeffrey Weeks, *The Shape of Space*, 2nd ed. (New York: CRC Press, 2002), especially 295–308. For a more detailed treatment, see the reference in the following note.

14. Neil J. Cornish, David N. Spergel, and Glenn D. Starkman, "Circles in the Sky: Finding Topology with the Microwave Background Radiation," *Classical and Quantum Gravity* 15 (1998): 2657–70, also available online at <http://arxiv.org/abs/gr-qc/9602039>. Moreover, the authors continue this paragraph with a discussion of the scientific ambiguity this phenomenon of "ghost" images leads to: "Many authors have sought to use this fact to limit the scale of the topology by searching for multiple images of recognizable objects. Unfortunately this approach is complicated by the fact that the different images will present the object at different epochs in its evolution, at different distances, at different redshifts, with different reddening factors, and from different perspectives. In all but a flat geometry, the images will also be stretched or compressed differently" (2).
15. *Serial Experiments Lain*, Ep. 8: "Rumors."
16. Ibid.
17. Adèle-Elise Prévost, "The Signal of Noise," illustrated by MUSEbasement, *Mechademia* 3 (2008): 173–88.
18. One can define the distance between two nodes as the length of the shortest path joining them together. However, this shortest-length path need not be unique.
19. There are, of course, infinite graphs. As a model universe for the Wired, however, the graph must be finite, as it is physically comprised of the sum of all human-manufactured electrical networks.
20. *Shin seiki evangerion*, dir. Anno Hideaki, TV series, 26 episodes (1995–96); translated as *Neon Genesis Evangelion: Platinum Collection*, 6-DVD box set (Gainax, 2005), Ep. 16: "Shi ni itaru yamai, soshite" (Sickness unto death, and . . .).
21. *Serial Experiments Lain*, Ep. 13: "Ego."
22. Ibid.
23. Ibid.