the fourth dimension and non euclidean geometry in modern art leonardo series

#fourth dimension art #non-euclidean geometry modern art #leonardo series art #spatial concepts art #modern abstract art geometry

Explore the profound influence of the fourth dimension and non-Euclidean geometry on modern artistic expression, as examined in the exclusive Leonardo Series. This captivating analysis reveals how artists have translated complex mathematical and spatial theories into ground-breaking visual works, challenging conventional perceptions of reality and form.

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And here's where it gets really interesting
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Grandfather Paradox Solution Using a Möbius Strip
A Closed 2D Manifold
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Squirrel - Three Dimensions for a 2D Creature
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4- Space
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Either in Columns or Rows or Matrices or Cubes or Something like that but It's a Whole Big Kind of Set of Numbers That Can Tell You a Map from a Set of Vectors to another Set of Vectors That's all It Is It's a Way of Mapping Vectors to Vectors and the Riemann Curvature Tensor Is this Particular Map so the Riemann Curvature Tensor Specifies at every Point at every Point You Can Do this You Give Me a Point I'M Going To Give You Two Different Vectors I'M Going To Track Parallel Transport around a Third Vector and See How Much It Moves by that's the Value of the Riemann Curvature Tensor Which Tells Me What Is the Distance along an Infant Decimal Path the Metric Exists at every Point It's a Field That Can Take On Different Value the Connection Is the Answer to How Does How Do I

Parallel Transport Vectors and It Is Also a Field So at every Point I Have a Way of Parallel Transporting Vectors in every Direction so It's a Complicated Mathematical Object and I Call that a Connection if You Just Want To Think about What Do You Mean by a Connection It's a Field That Tells Me How To Parallel Transport Things It Conveys that Information What Does It Mean To Keep Things Constant To Keep Things Parallel
And It all Fits Together a Nice Geometric Bundle in Fact You Know When We Thought about Newtonian Physics versus the Principle of Least Action the Newtonian Laplacian Way of Thinking about the Laws of Physics Was Start with a Point and Just Chug Forward Using F Equals Ma You Get the Same Answers Doing Things that Way as You Do with the Principle of Least Action Which Says Take the Whole Path and Minimize the Action along the Path You Might Think Is this Analogous to these Two Different Ways of Defining Straight Lines the Whole Path and Find the Minimum Length or Parallel Transport Your Direction Your Momentum Vector and the Answer Is Yes They Are a Hundred Percent Completely Analogous It's the Differential Version versus the Integral Version if You Want To Think about It that Way
You Might Think Is this Analogous to these Two Different Ways of Defining Straight Lines the Whole Path and Find the Minimum Length or Parallel Transport Your Direction Your Momentum Vector and the Answer Is Yes They Are a Hundred Percent Completely Analogous It's the Differential Version versus the Integral Version if You Want To Think about It that Way Okay so that's Geometry for You There It Is that's all You Need To Know Everything Else Is Derived from that in some Sense but the Derivations Might Be Hard Next We'Re on to Topology Topology Is Sort of the Opposite in some Sense of What We'Ve Been Doing So What We'Ve Been Doing Is Working Really Hard To Figure Out How at every Point To Characterize the To Answer the Question How Curved Is this Space That We'Re Living in Topology Doesn't Care about the Curvature of Space at every Point at all Topology Is the Study Properties of Spaces
Deform a Sphere into a Torus
And I CanNot Deform One into the Other I CanNot Do that Smooth Movement of the Circle in this Plane That Doesn't Go through the Point so these Are Topologically Different Okay so the Fundamental Group of the Plane Is Just Trivial It's Just One Element There's Only One Way To Map a Circle into the Plane but the Plane-a Point I Clearly Have Different Ways this Orange Curve I Can Deform Back to the Identity and by the Way I Should Mention this There's a Sense There's a Direction so the Circle Has a Clockwise Nisour Anti-Clockwise Ness Notion So Let Me Draw that I'Ve Drawn It this Way I Can that's that's a Different Topological
Okay I CanNot Deform the Loops That Go Around Twice to either the Loops That Go Around Once or the Loops That Go Around Zero Times What this Means Is They Put Braces around Here so You Know that this Is the Space I'M Mapping It to the Fundamental Group of the Plane-a Point Is Characterized by Something We Call the Winding Number of the Map We Have all Sorts of Ways of Mapping the Circle into this Space and all That Matters topologically Is How Many Times the Circle Wraps around Winds around that Point so the Winding Number Could Be 0 for the Orange Curve It Could Be 1 for the Yellow Curve It Could Be 2 for the Green Curve
That's Why It's Called a Group because You Can Add Integers Together We'Ll Get Later to What the Technical Definition Is Well What I Mean by Group but the Point Is this Is a Top this Feature of the Space Is a Topological Invariant and the Feature Is Quote-Unquote the Integers the Integers Classify the Winding Numbers the First the Fundamental Group of the Plane so We Can Do that with Other Spaces Right What about the Sphere so What We'Re the to the 2-Dimensional Sphere in this Case Right So Actually Then Let's Do the One Dimensional Sphere Why We'Re at It
And those Are Different Things That Green Circle and that Orange Circle CanNot Be Continuously Deformed into each Other There's Basically Two Distinct Topological Ways of Wrapping a and the Taurus and Once I Wrap Around once I Can Wrap around any Number of Times so that Is a Very Quick Hand Wavy Demonstration of the Fact that Pi One of the Tourists Is Z plus Z It's Two Copies of the Integers Two Different Winding Numbers How Do You Wind around this Way How Do You Wind around that Way so You Might Think You Might Think for these Brief Numbers of Examples That the Fundamental Group Pi One of any Space Is either Zero or It's the Integers or some Copy of the Integers
I Get another Curve That Is Deformable to Zero Right That Doesn't Wind At All and that's a That's a Perfectly Good Reflection of the Fact that in the Integers Z Has the Property That plus 1 Plus minus 1 Equals Zero Right Not a Very Profound Mathematical Fact but There It Is So if that Were True if It Were True that the Same Kind of Thing Was Happening in this Doubly Punctured Plane I Should Be Able To Go around a and Then around B and Then I Should Be Able To Go Backward around a and Backward around B and I Should Be Equivalent to Not Doing Anything At All but that's Not Actually

What Happens Let's See It's Unlikely I Can Draw this in a Convincing Way but Backward And It Comes Out but Then It's GonNa Go Up Here so that Means It Comes Over There That Goes to that I'M GonNa Keep Going so You Can See What's Happening Here My Base Point Is Fixed but I Have this So I'M Going To Make It Go Down and that's GonNa Go Up this Is GonNa Go like this I'M GonNa Keep Going and Then I Can Just Pull this All the Way through So in Other Words I Can Contract this Down to Zero I Hope that that's Followed What I Did Here if I Call this Aabb this Is Aa the Be Aa the Be Aabb and They Just Contract Right Through

The Genius: Leonardo da Vinci Explained in 11 Minutes - The Genius: Leonardo da Vinci Explained in 11 Minutes by Simply Explained 63,590 views 2 years ago 11 minutes, 33 seconds - Leonardo, da Vinci is widely regarded as one of the smartest persons in human history. His influence breaches time and space, ...

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algebra and of the quadratic reciprocity law.[citation needed] This century saw the development of the two forms of non-Euclidean geometry, where the parallel... 136 KB (15,931 words) - 06:17, 7 March 2024

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generalised the concepts of geometry to develop non-Euclidean geometries. Now called Pascal's triangle. For example, the "problem of points". That is, {\displaystyle...144 KB (16,402 words) - 05:54, 25 February 2024

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