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# Processing the Identity of a Reasoning Self

## Differences Between Recursion and Self-Reference

## Outline

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- Introduction
- Descartes: a static logic of presence
- Processing references: a temporalized logic of distinctions
- Self-reference as autopoiesis

## Introduction

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- What I am not talking about
- Questions: a traditional tool in philosophy
- Different communities, different terminology

## Descartes: Logic of Presence

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- Importance for the „modern times“
  - Validation process of the truth
  - Presence of the reasoning self was not proved
  - Evidence and Science
- Generalization and subiectum
- Hegel's shortcut

## Descartes (2): Problems With the Logic of Presence

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- Truth depends on identity
- Descartes' construction of identity ignores
  - sequences of operations
  - paradox implications of self-reference
  - the temporal structure

## Kant: the vehicle of perception

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- Self-reference as a structural requirement for reasoning
- Identity as a construction
- Hegel (et al.) – the paradox foundation of a reasoning self
  - The reasoning self is the self of reasoning
  - The reasoning self is not the self of reasoning
  - True infiniteness, foundation of knowledge

## Processing of Cybernetic Systems

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- Task to engineer capacities for self-organization
  - The observer
  - The "difference that makes a difference"
- ➔ The logic of processes is not the (observable) logic of the system

## Constructivism in System Theory

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- Autopoiesis: any element of the system is constructed by the system
- Emergence: properties/abilities cannot be derived from the elements of the system
- Properties exist only in the observer's eye
- „Radical“ position: no „Inside“ or „Outside“ of the system

## Spencer Brown: Temporalized Logic of Distinctions (1)

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- Reputation of the author
- „Laws of Form“ 1969, interpretations by Luhmann in the 80's
- Common foundation for boolean and numeric algebra
- Gradually building up from „common sense“
- Basic operation with forms: process of establishing and crossing a border

## Spencer Brown: Temporalized Logic of Distinctions (2)

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- „Draw a distinction“ – the order to establish a border
- Marked state vs. unmarked state (Motive/Background)
- Using a distinction: „crossing“ a border
- „Re-entry“ of the calculus (Luhmann) – dealing with the first distinction
- Treatment of the „temporal paradox“ („Unterscheiden-und-Bezeichnen“)

## Self-Reference and Autopoiesis

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- Elements and relations are recursively combined
- „Fractal dimension“ of complexity
- Recursion as a threat
- Emergence of self-organization capacities: Self-reference by „interrupting“ recursion

## Questions

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- Can we say more about self-reference that it exists for an observer's eye?
- What are the properties/attributes of a „self-referential“ observer?
- Can knowledge at all be processed independent from an observer?
- Is achieving emergence an accepted „design principle“ in AI?