

# Human-robot-intermittency and -invariants

Human-robot-  
intermittency  
and  
-invariants -

B. Heiden et  
al.

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2. Beauty

3. Robot-o

Robot-os Invariants -  
Axioms

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Summary,  
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International Tiger Day:



Thursday, July 29 • 1:01pm - 1:15pm  
(London Time)

Conference Date: 07/29-30/2021, <https://sched.co/1Cbl>



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## 1. Introduction


**SUSTAINABLE DEVELOPMENT GOALS**

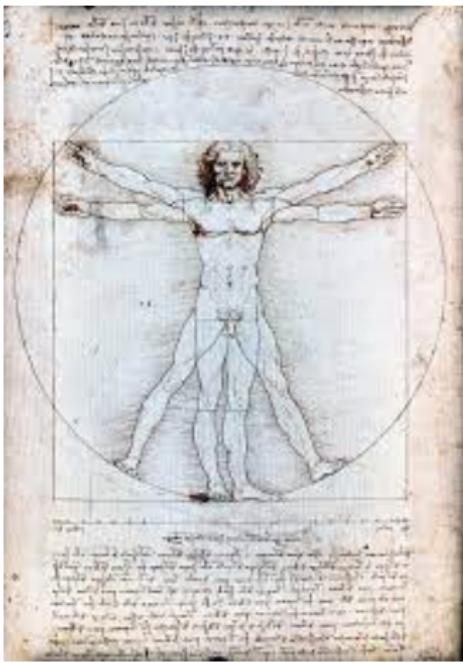

1

- all sustainable development - all life is affected by systems theory

<sup>1</sup>[https://de.wikipedia.org/wiki/Ziele\\_f%C3%BCr\\_nachhaltige\\_Entwicklung](https://de.wikipedia.org/wiki/Ziele_f%C3%BCr_nachhaltige_Entwicklung)

- ① robot-human interaction → qualitatively
- ② description by robot-o - an selforganisational cybernetic unit by order steps
- ③ logistics application

## 2. Beauty I



**Figure 1:** Vitruvian Human of Leonardo da Vinci  
[https://de.wikipedia.org/wiki/Vitruvianischer\\_Mensch](https://de.wikipedia.org/wiki/Vitruvianischer_Mensch)

### 3. Robot-o I

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- Invariants
- Order Steps
- Logistics Application

## Robot-os Invariants - Axioms I

### Axiom 1

*When the system is chaotic or has a strange attractor, it has the greatest potential to build dynamic order.*

### Axiom 2

*Humans or Human-os and robots or robot-os are getting an increasing similarity or human-robot-equity level resulting in uprising robot-human-os, with merged and intermittently enhanced properties.*

### Axiom 3

*As was the computing ability, the limiting factor of growth will be that of the human-os or robot-os in the future.*

## Robot-os Invariants - Axioms II

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### Axiom 4

Beauty and form are related in relation to their species.

### Axiom 5

Information versus truth content: robot versus human. The truth content W changes with the level of the category K:  
 $W=f(K)$ .

# Robot-os Invariants - Axioms III

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## Axiom 6

*A person who is a robot potentially harms himself and others (e.g. a perfectionist). Hence the critical (existential) potential, or sustainable optimal operation of human-robot-os (humans, robots, and human-robot-hybrid forms), is to use the creative potential across the creativity border in Figure 7.*

# Robot-os Invariants - Axioms IV

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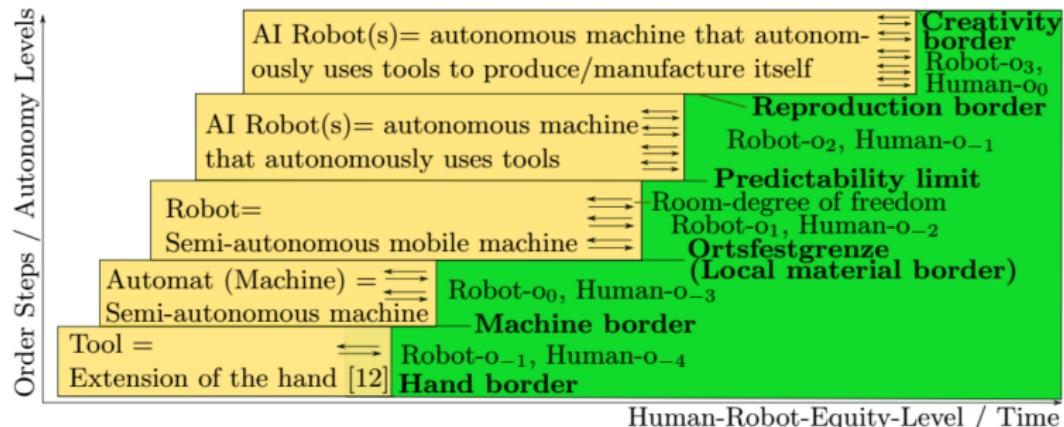
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Bidirectional level:  $\longleftrightarrow$  each level is a next step in order and increase in freedom through interconnectivity

**Figure 2: Human-os and robot-os - how they merge in steps of order and human-robot- intermittency.**

# Application: Quantification of higher human-robot-os properties I

- creativity region: high intermittency → measures of 'beauty'
- measurement of grade of irrationality – of importance in chaostheoretical investigations → the golden mean is the most irrational number (on the 'border' to chaos<sup>2</sup>)

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<sup>2</sup>Hilborn, *Chaos and Nonlinear Dynamics - An Introduction for Scientists and Engineers*

## Application: Role of Humans in Future Logistics I

- increasing amount of data, decision-making processes in logistics → (Axiom 3 - increasing robotic applications, e.g. Amazon)
- deterministic process of actual processes cannot foresee all human/technical factors - e.g. different positions of goods. → Axiom 5,6
- human-o-triangle: human operator / user - machine - product; constant interaction → 'Anschlussfähigkeit' (reconnectivity) remains<sup>3</sup>

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<sup>3</sup>with Luhmann, soziale Systeme Luhmann, *Die Gesellschaft der Gesellschaft*; Luhmann, *Soziale Systeme*

# Conclusions and Outlook I

## Summary and Conclusions:

- introduction to 'beauty' as a future measure of human-robot-comparability
- six axioms - of robot-os
- gap between humans and robots is becoming smaller → overall human suffering decreases
- order hierarchy of robot-os – how do we recognise and build increasingly human-like-robots

## Outlook:

- Human-robot intermittency increases both - human and robot - survivability → coevolution

Thank you cordially for your attention!



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PS.: The presentation can later also be found at:

<http://www.dr-heiden.com/Vortraege.htm>

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