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Recurrence Analysis and Literariness

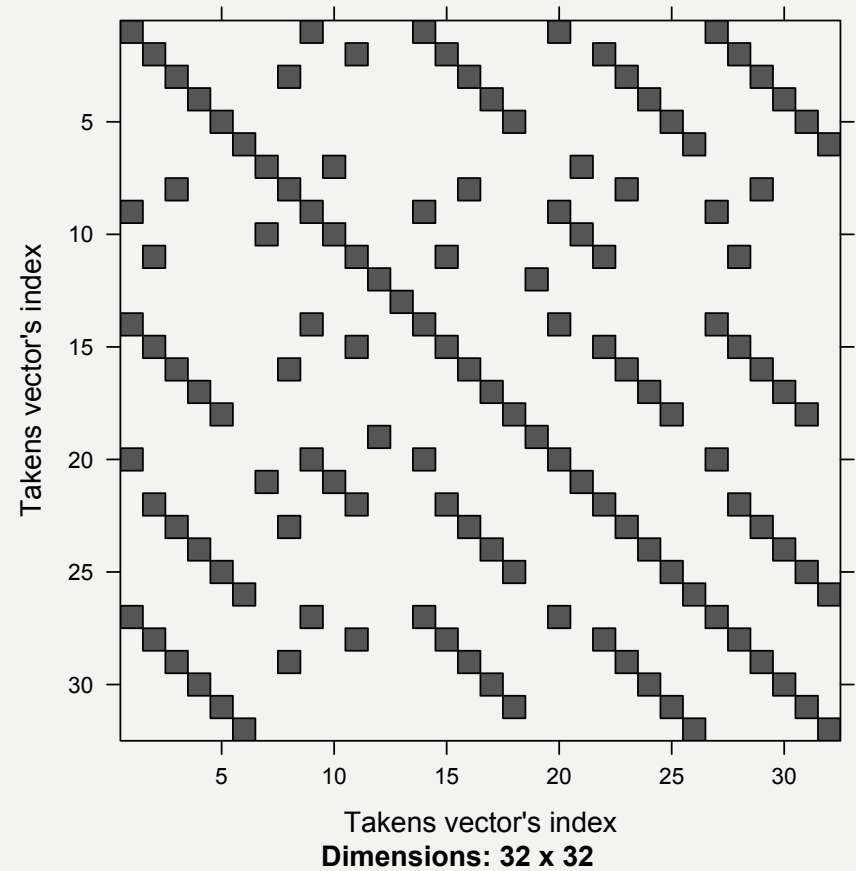
Dr. Matthias Springer



- Originally developed in physics and applied in other fields
- RQA Analysis applied to complex dynamic systems
- RP visualized complexity of the structure
- Language is a structured, complex and dynamic system of a flow of symbols
- Recurrence is defined as a point which repeats itself
- Example: “Fischers Fritz fischt frische Fische”

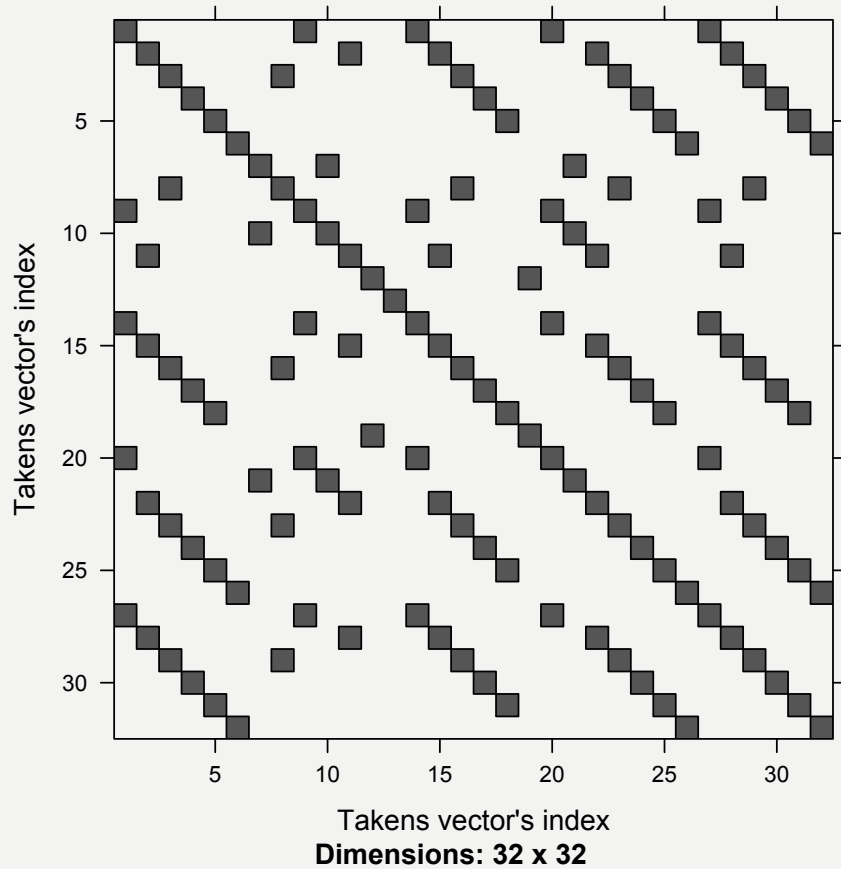
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Recurrence plot

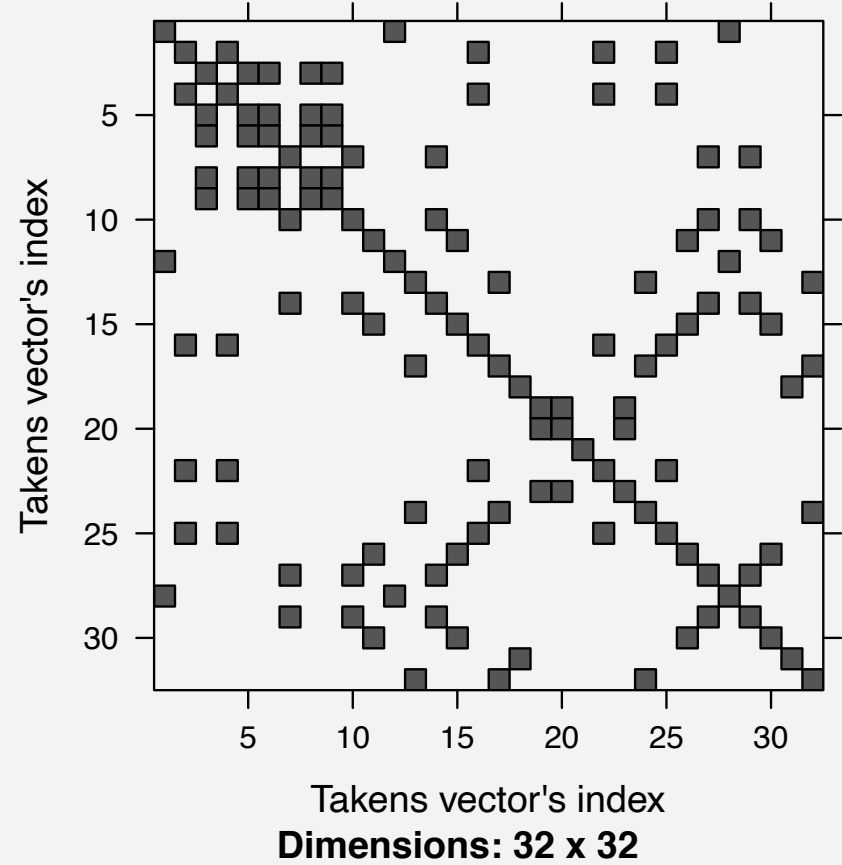


- Visualizing recurrences
- RC-Plot:
 - Dots: repetition of individual letters
 - Diagonal lines: repetition of conjoined letters
- Quantities from RQA
 - REC: percentage of recurrence point
 - DET: percentage of recurrent points forming diagonal lines (=determinism)
 - ADL: Average diagonal line length
 - MDL: Maximum diagonal line length
- Dependency of REC and DET
- Recurrence patterns provide information about the system → comparison: shuffled sequence

Original sequence



Shuffled sequence





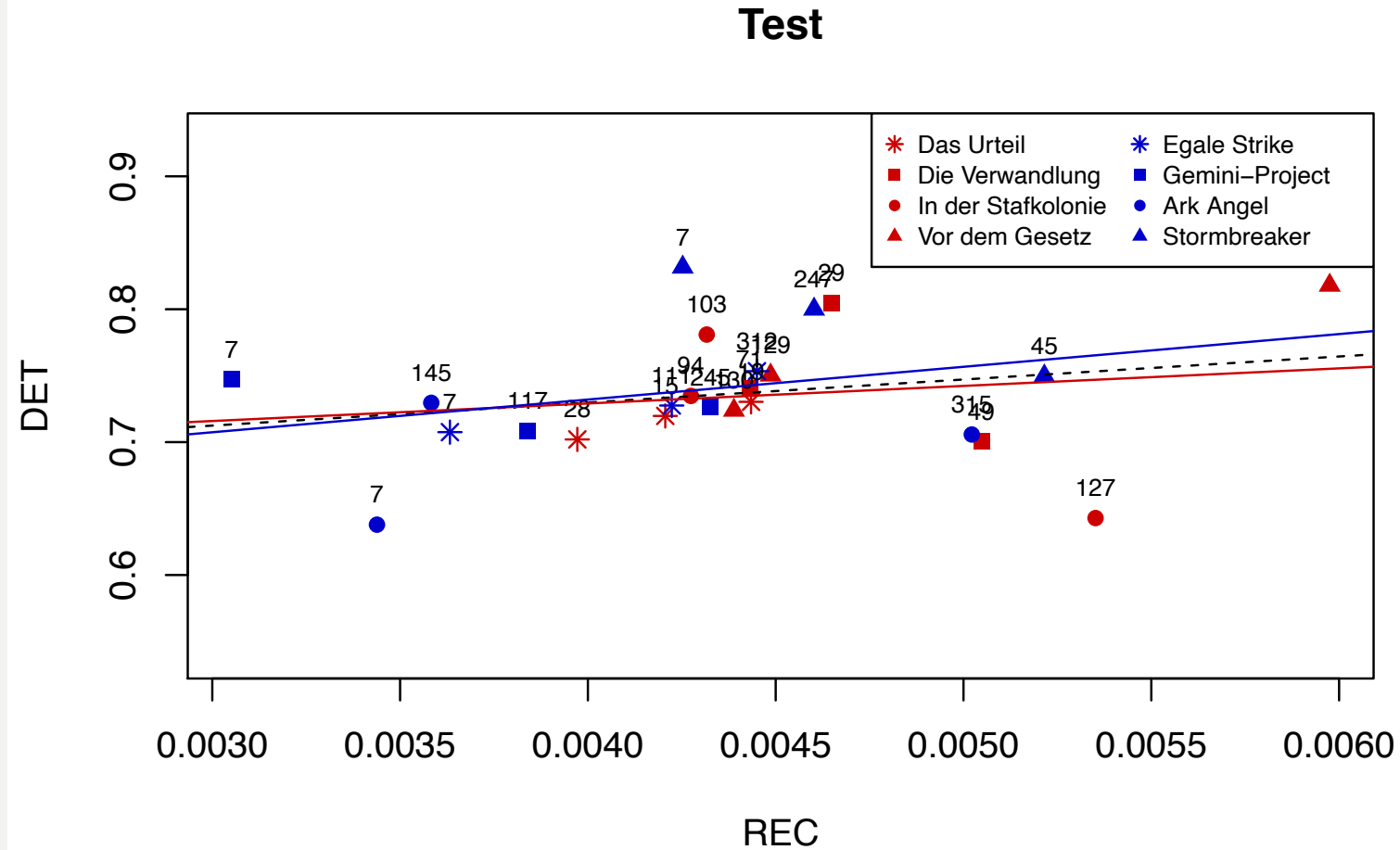
	Original	Shuffled
REC	0.13	0.13
DET	0.75	0.42
ADL	4.71	2.20
MDL	6	3

Hypothesis: In an ordered sequence of language tokens we expect a higher influence from REC on DET.

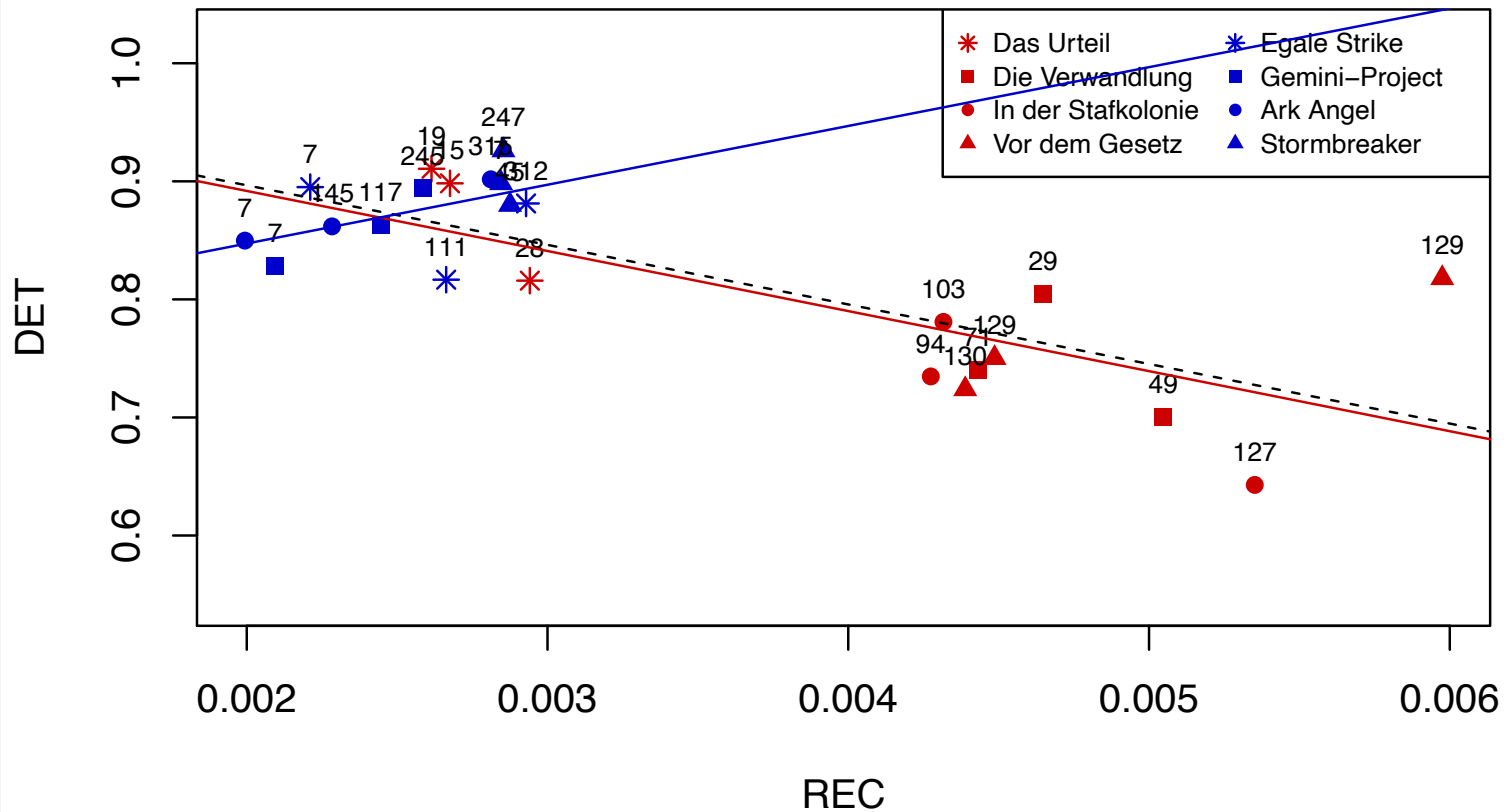
In this case: 5.76 (original) against 3.23 (randomly shuffled)

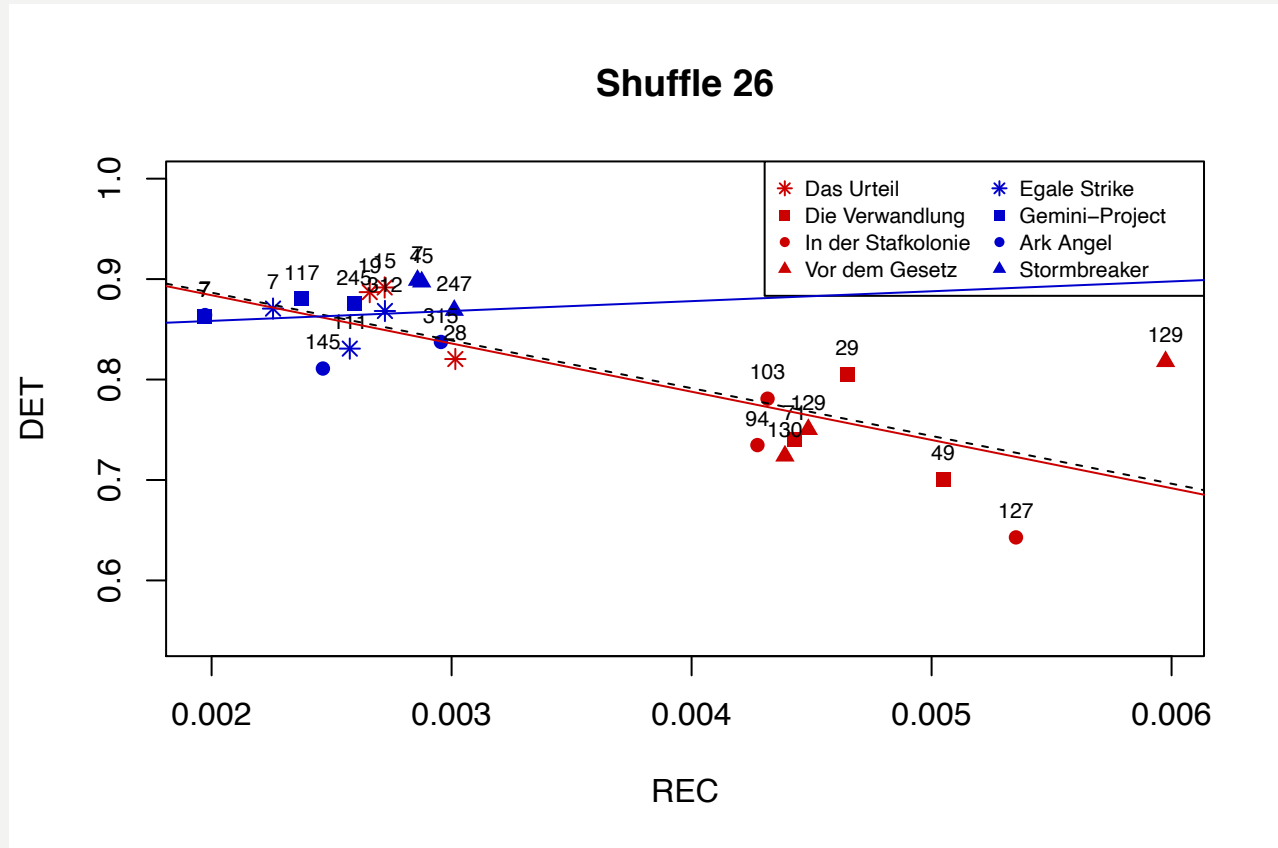
- Literariness: Effects & produces estrangement, defamiliarization & foregrounding on the level of discourse
 - (1) Related to a special kind of language use
 - (2) Related to specific types of texts marked as literary
 - (3) Denotes to a specific mode of processing texts
- On level (1): Literariness should have an impact on the complexity structure of the flow of symbols in a text
- More complexity on this level effects defamiliarization
- RQA is independent from semantics, interpretations or coding any features by subjects

- Comparison of two Corpora – one supposed to support literariness, the other trivial literature
- Corpora:
 - Franz Kafka (Das Urteil, Die Verwandlung, Die Strafkolonie, Vor dem Gesetz) – classified as high-level literature (aesthetic reading mode)
 - Anthony Horowitz (Eagle Strike, Gemini-Project, Ark Angel, Stormbreaker), classified as low-level literature (immersion reading mode)
- 3 snippets of each text (beginning, middle and the end) with a length between about 400 to 600 characters
- Embedded dimension = 3 (3 characters create an unit of recurrence)
- Linear model to observe the influence form REC on DET in each corpus
- Shuffle the sequences in each corpus to observe the behaviour of complexity



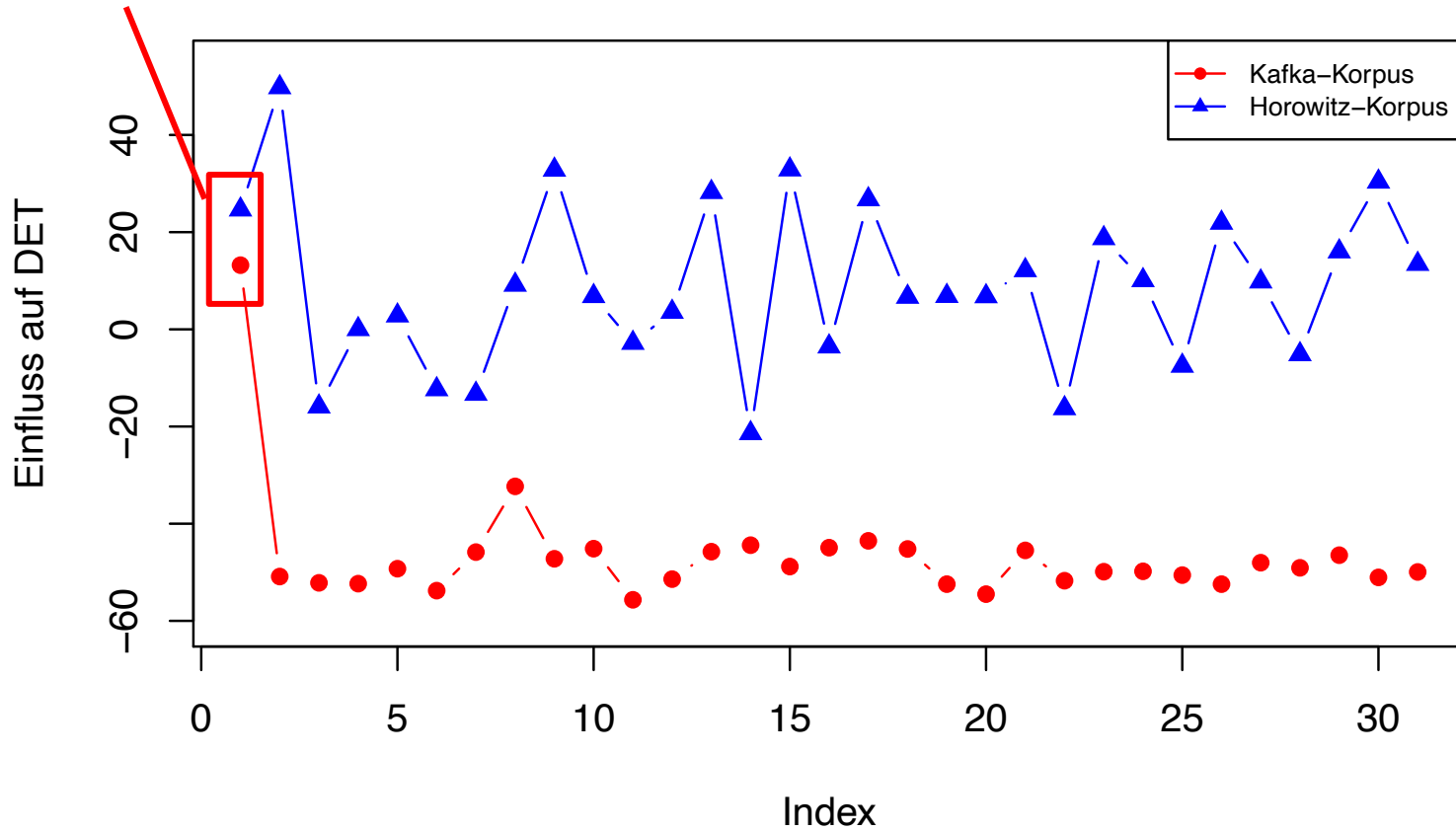
Shuffle 1





- Separation & order
 - Kafka-Corpus higher REC und lower DET, except “Das Urteil”
 - Kafka show a wider dispersion
- REC is not stable as in my “Fischer”-example from the beginning; reason: I mixed up each character but analysed an embedded dimension of three characters, so my units are not stable; but the number of types remains equal

original sequence



- Values of the shuffled sequences go down
- Influence from REC on DET is less in the Kafka-Corpus than in the Horowitz-Corpus
- This seems to be independent from semantics, aesthetics or other meaningful features in the language
- Authors, who determine to order their flow of alphabetic characters in respect of literariness do this in a more complex way than those, who don't.

- Literariness is dependent of recurrences in the language sequence: less recurrence means more literariness and vice versa
- Language of literariness is more complex as less literariness language
- The fits with Sklovskis suggestion of estrangement und defamiliarization of the reading process

Thank you!

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Credits to Sebastian Wallot (MPI)