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11/10/2010

Statistische verwerking van ringtestresultaten onder ISO 17043

Siegfried Hofman

Kader

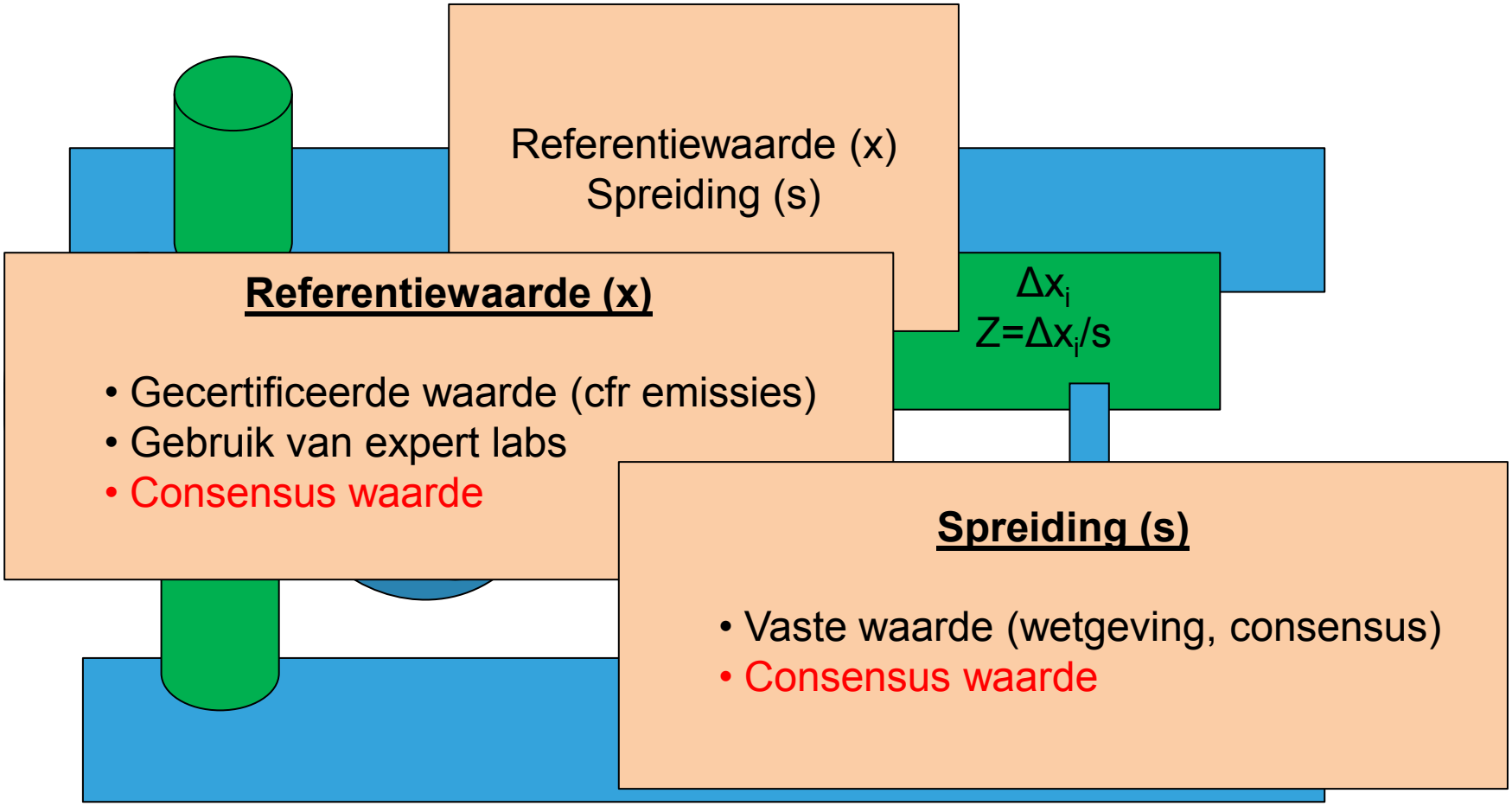
ISO 17043 (maa 2010): Conformity assessment – General Requirements For Proficiency Testing

- ISO Guide 43 (1997): Development And Operation Of Proficiency Testing Schemes.
- IUPAC : “Harmonized Protocol” (2006)
- ILAC G13 (2007): “Guidelines For The Requirements For The Competence Of Providors Of Proficiency Testing Schemes”
- ISO 13528 (2009): Statistical Methods For Use In Laboratory Testing By Interlaboratory Comparisons.

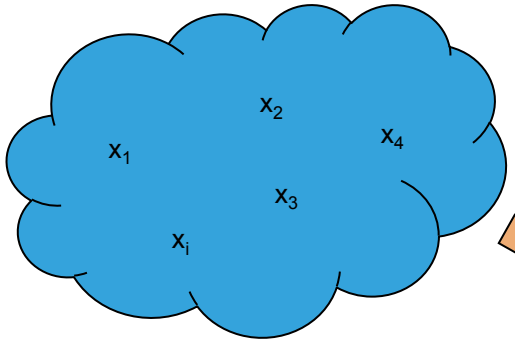
ISO 17043 (maa 2010): Conformity assessment – General Requirements For Proficiency Testing

- § 4.7.1.4 (data analysis and records)
  - "… The influence of outliers on summary statistics shall be minimised by the use of robust statistical methods or appropriate tests tot detect outliers…"
  - Ttz: de aanwezigheid van "slechte" resultaten binnen de groep mag geen invloed hebben op de kwaliteit van de evaluatie of op de appreciatie van de deelnemers.

Kader



Huidige behandeling van outliers



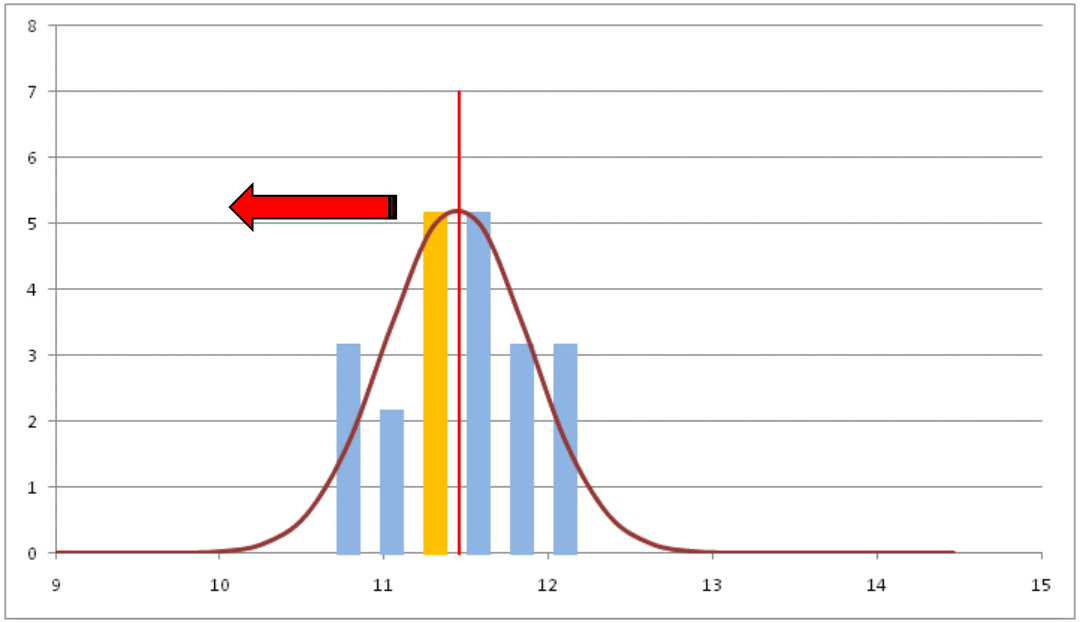
"… The influence of outliers on summary statistics shall be minimised by the use of robust statistical methods or appropriate tests tot detect outliers…"

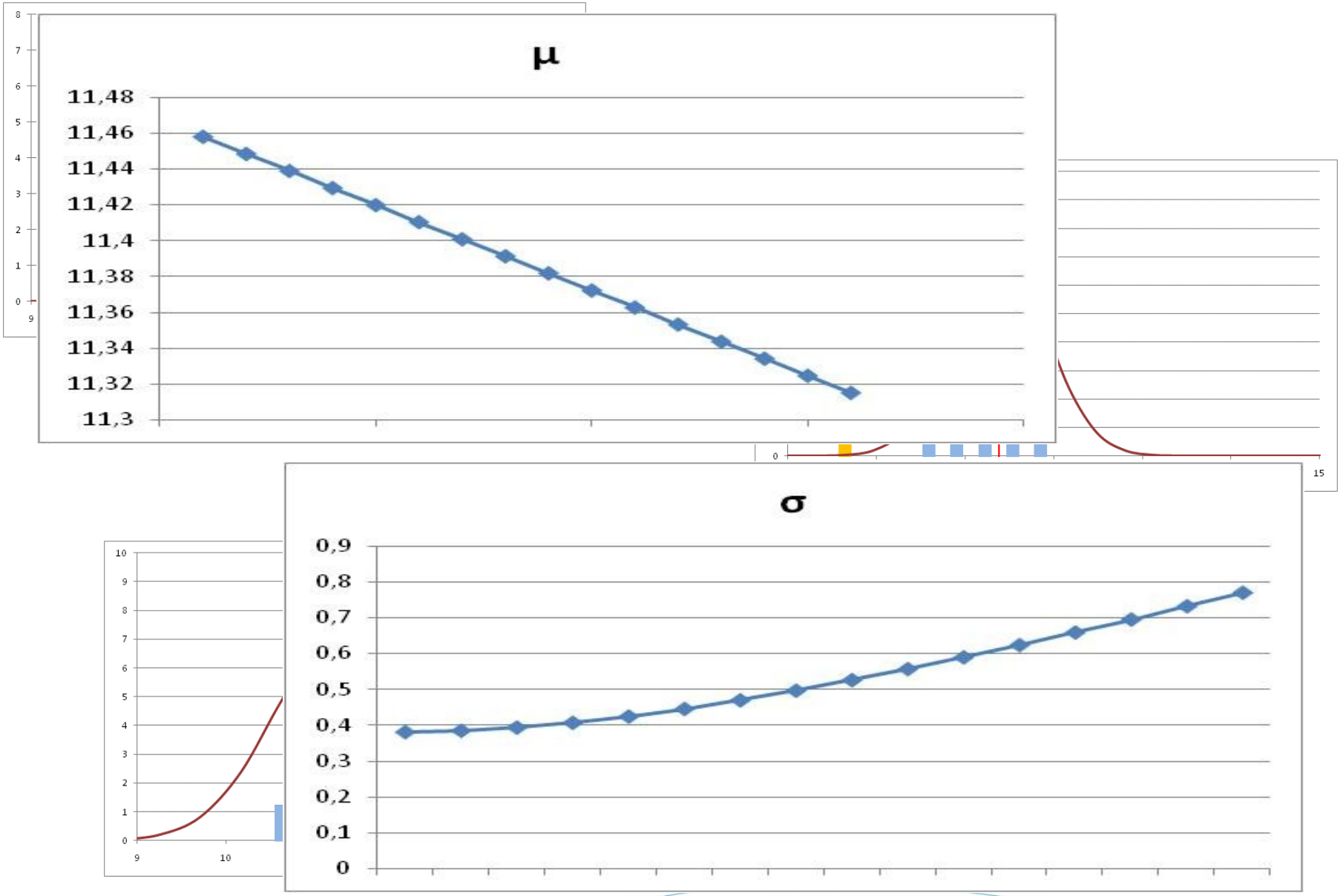
Berekening μ en σ

Berekening z-scores

Invloed van outliers

labo1	10,7															
labo2	11,8															
labo3	11,5															
labo4	10,9															
labo5	11,4															
labo6	11,2															
labo7	11,6															
labo9	10,9															
labo10	11,4															
labo11	11,2															
labo12	11,8															
labo13	11,1															
labo14	12,0															
labo15	11,8															
labo16	12,0															
labo17	11,1															
labo18	11,7															
labo19	12,0															
labo20	11,5															
labo21	11,6															
labo "X"	11,4	11,2	11	10,8	10,6	10,4	10,2	10	9,8	9,6	9,4	9,2	9	8,8	8,6	8,4





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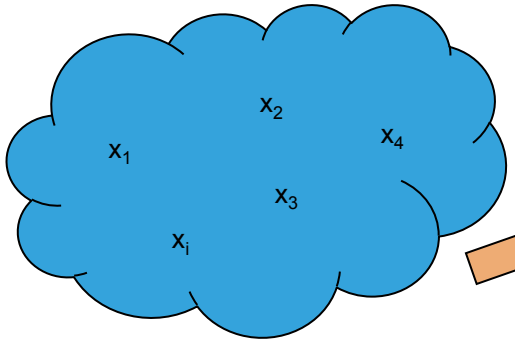
Huidige behandeling van outliers



Verwijderen van outliers

- klassiek: Grubbs test

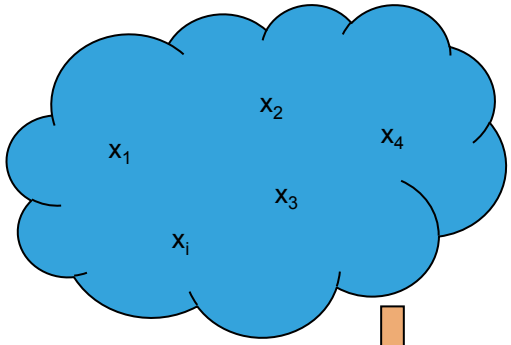
$$G > \frac{(N-1)}{\sqrt{N}} \sqrt{\frac{t^2_{(\alpha/(2N),N-2)}}{N-2+t^2_{(\alpha/(2N),N-2)}}}$$

- gebaseerd op normale verdeling van de datapunten

Berekening μ en σ

Berekening z-scores

Huidige behandeling van outliers



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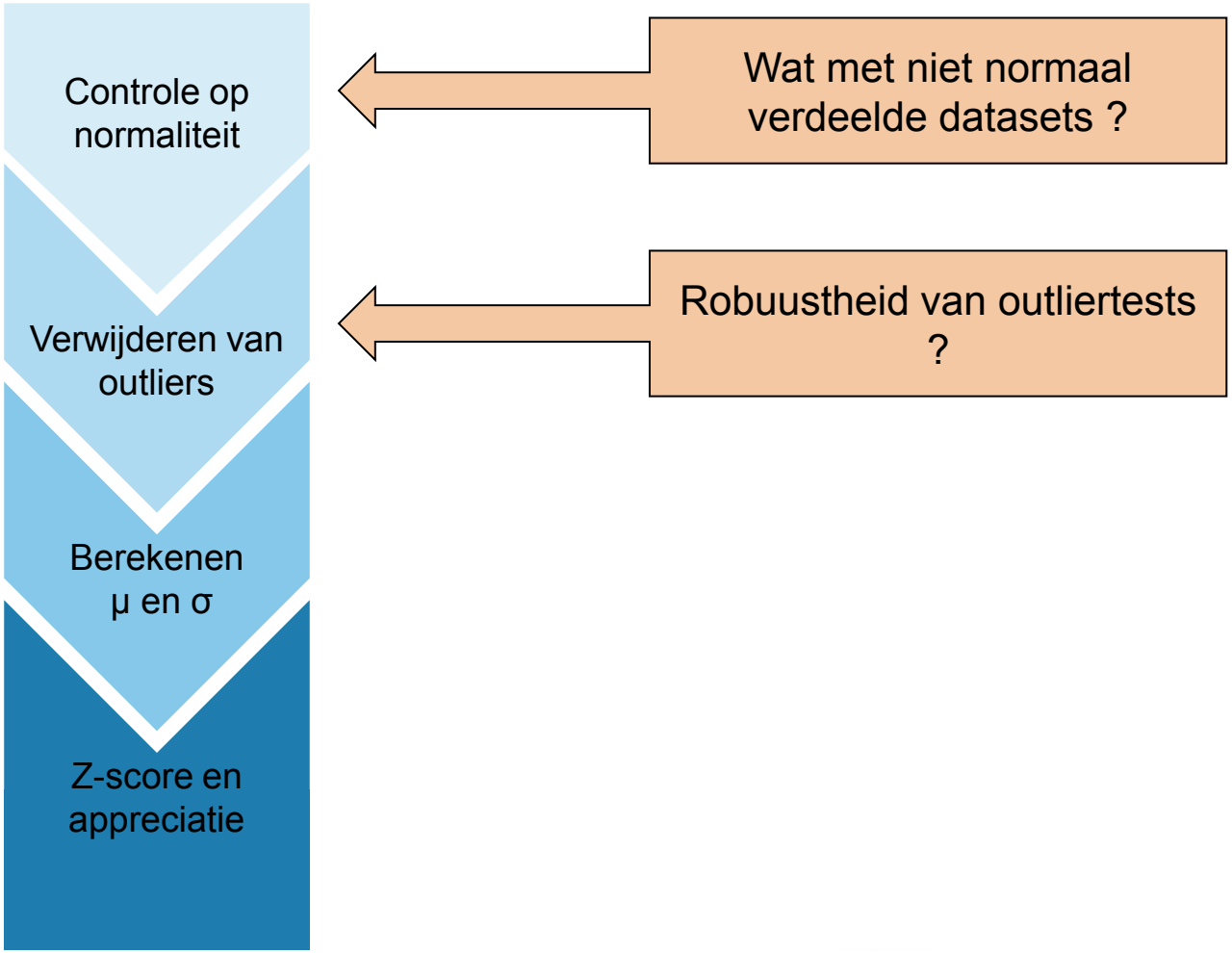
Controle op normaliteit

- Anderson Darling
- Shapiro Wilks
- Kolmogorov
- …

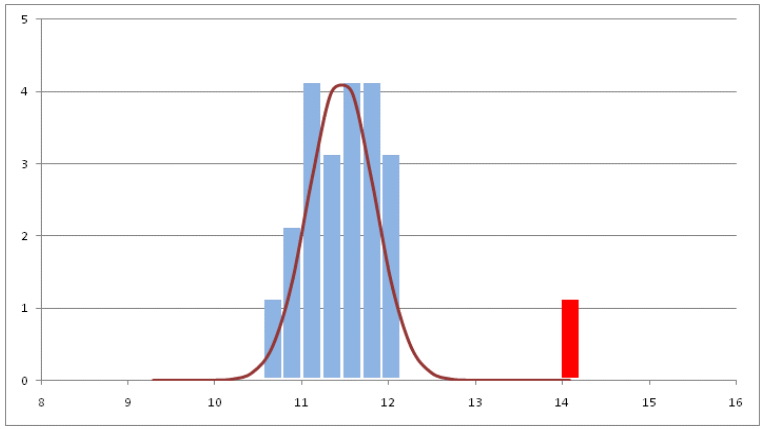
Berekening μ en σ

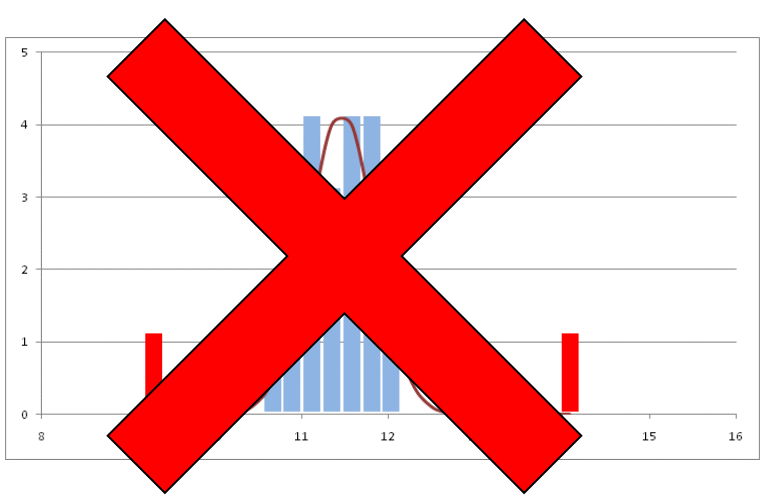
Berekening z-scores

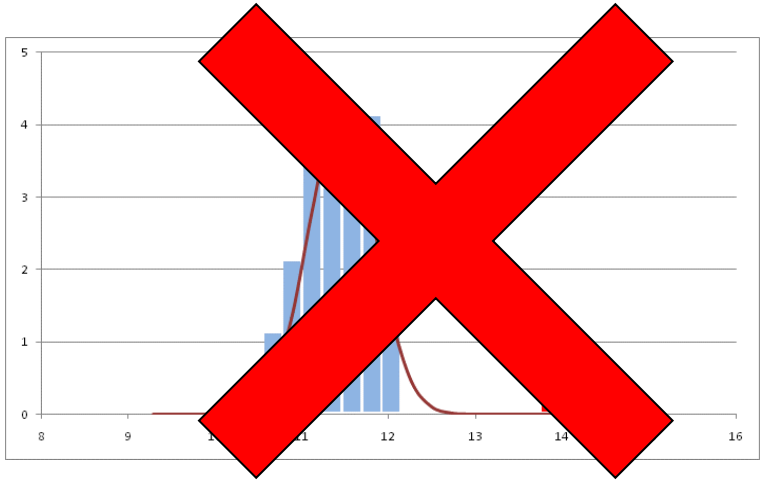
Huidige behandeling van outliers



Robuustheid van outliertests







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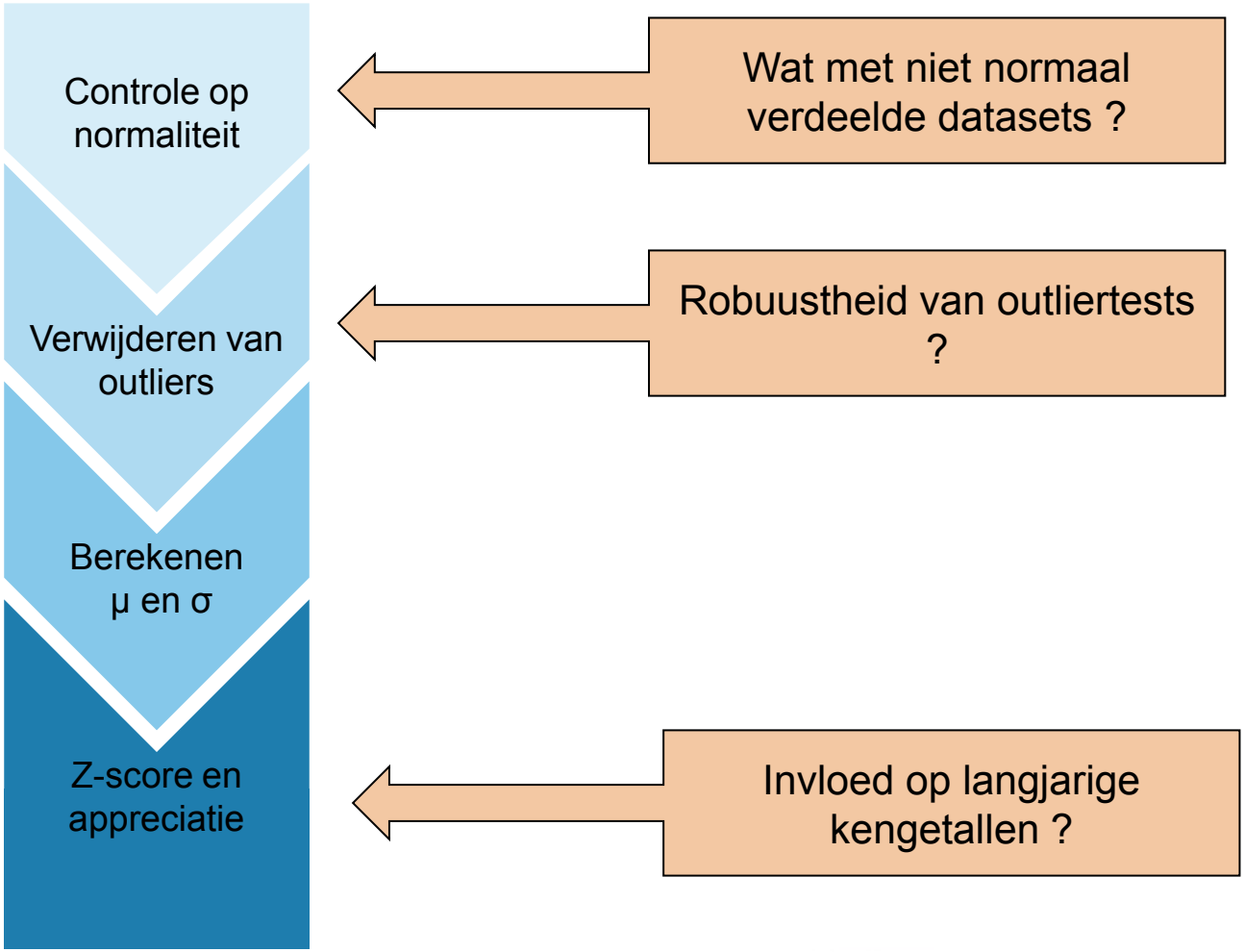
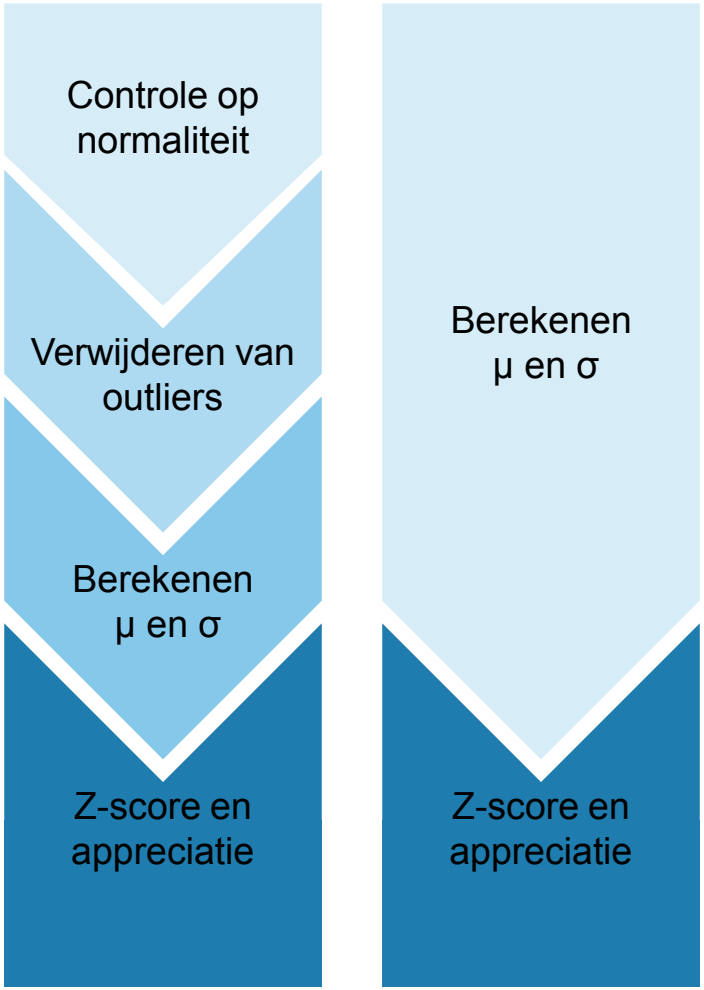


Huidige behandeling van outliers



Non parametrische benadering : niet afhankelijk van de dataset verdeling

Robuust mbt aanwezigheid van aberante resultaten

Nieuwe benadering

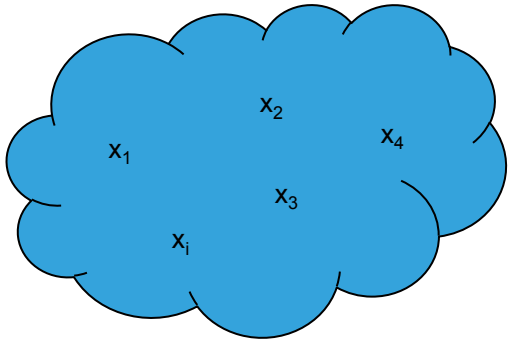
Consensus waarde

- Gemiddelde na uitschietertest
- Mediaan
- Huber estimator (Alg A)
- Hampel estimator

Spreiding

- SD na uitschietertest
- Huber estimator (Alg A)
- Q method

Alg A



- mediaan (μ)
- standaardafwijking tov mediaan (σ)
- voor ieder punt $z=(x_i-\mu)/\sigma$

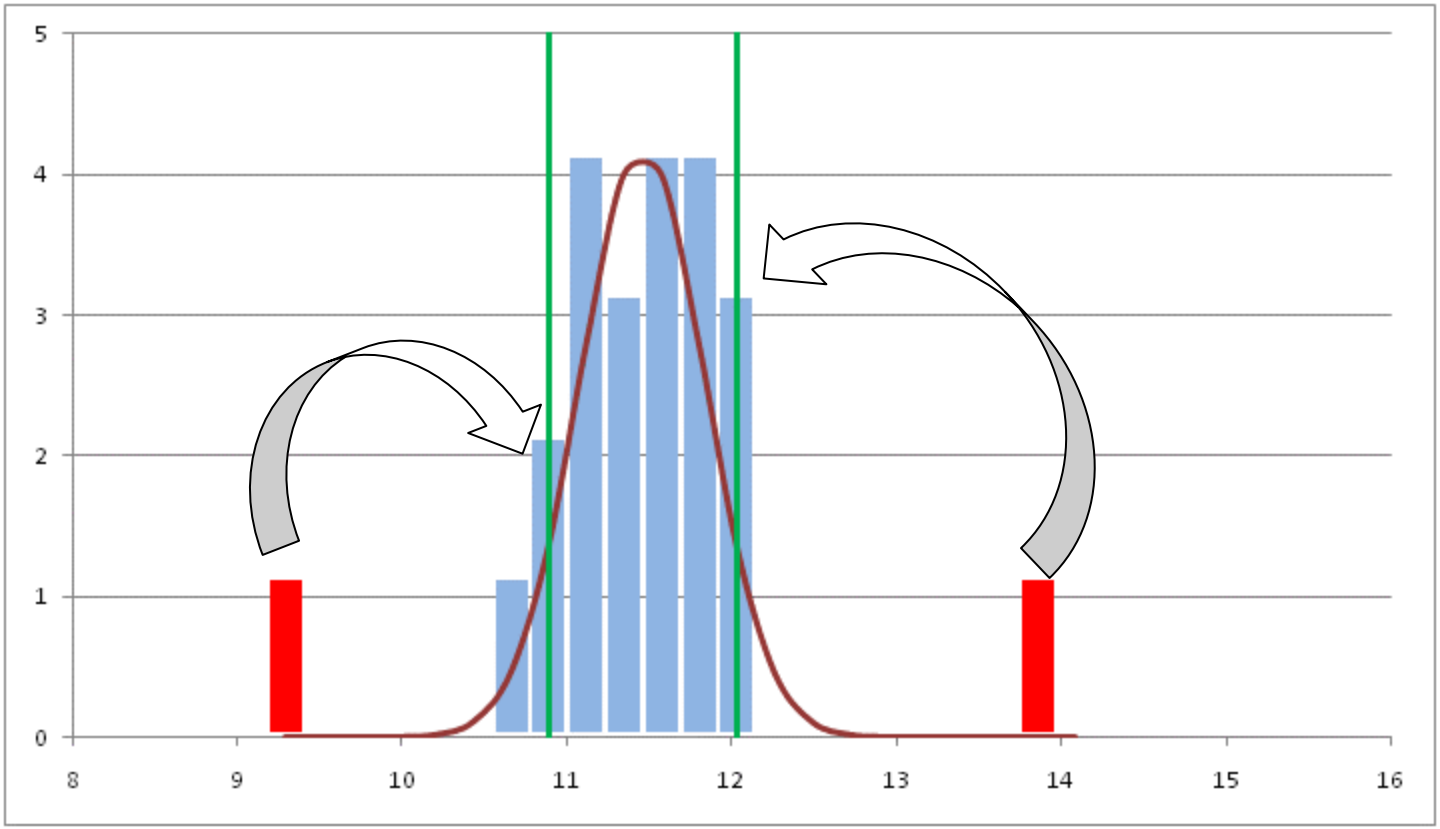
- datatransformatie voor z>1,5

convergentie

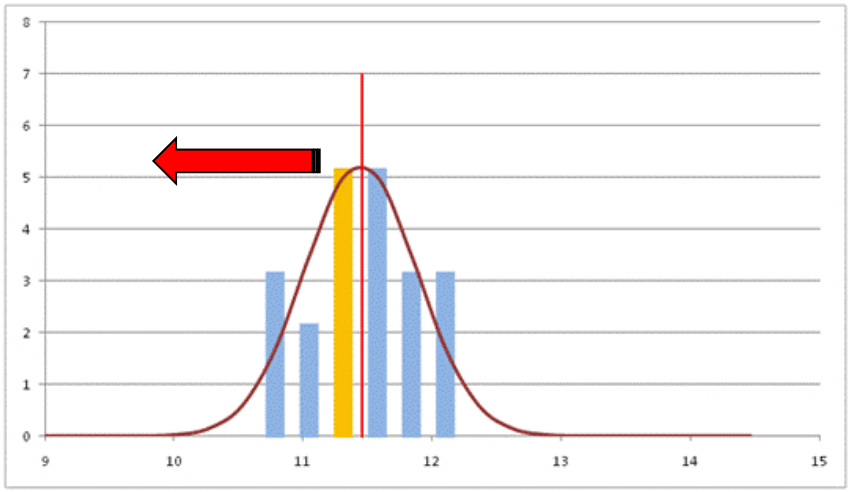
- gemiddelde (μ)
- standaardafwijking (σ)
- voor ieder punt $z=(x_i-\mu)/\sigma$

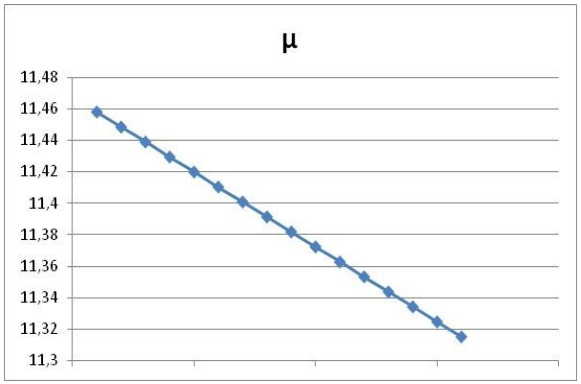
$\mu_R - \sigma_R$

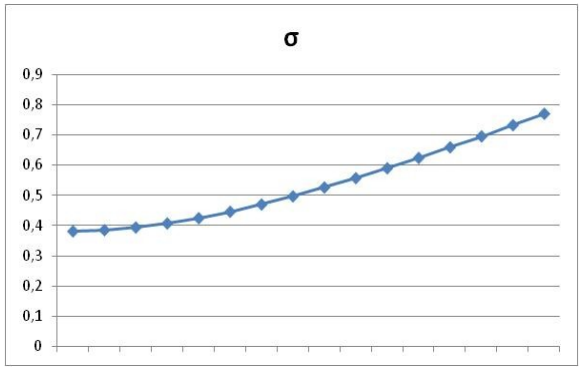
Alg A



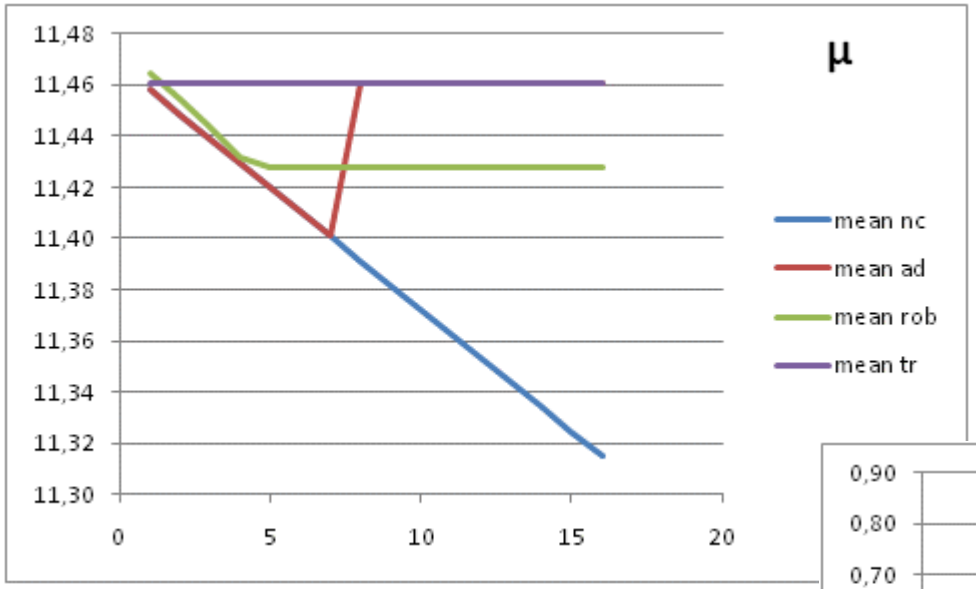
Alg A

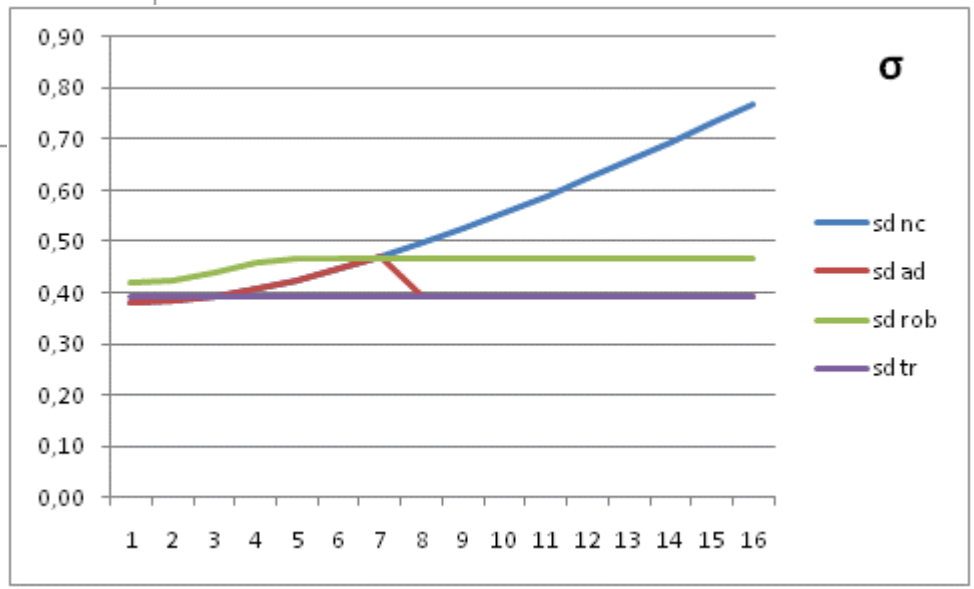




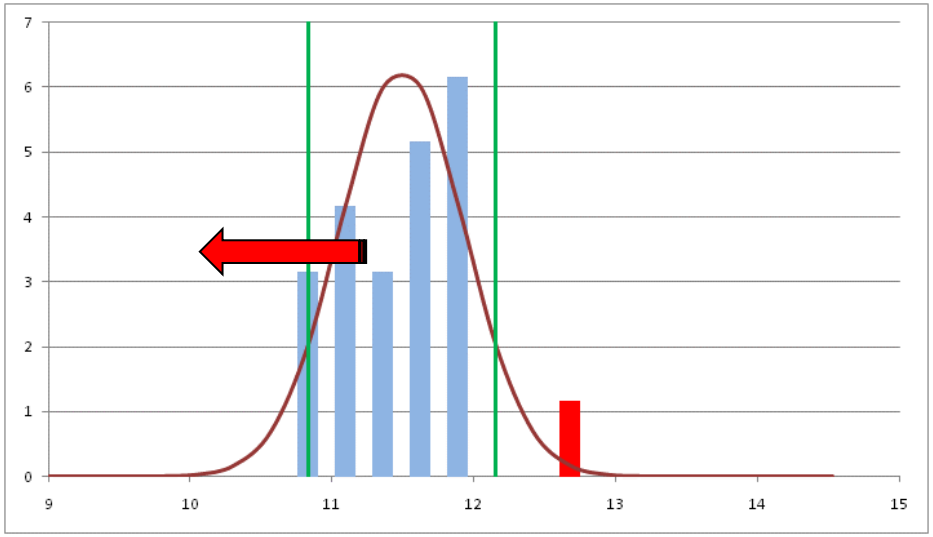


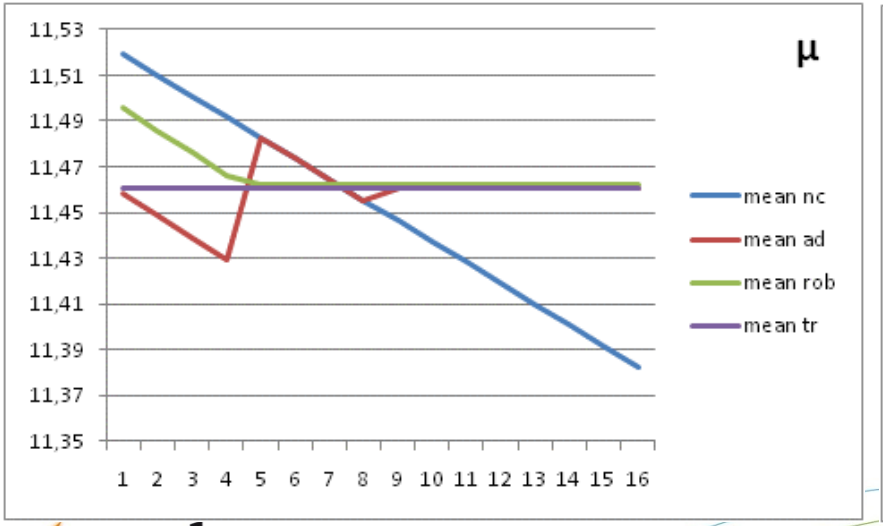
Alg A

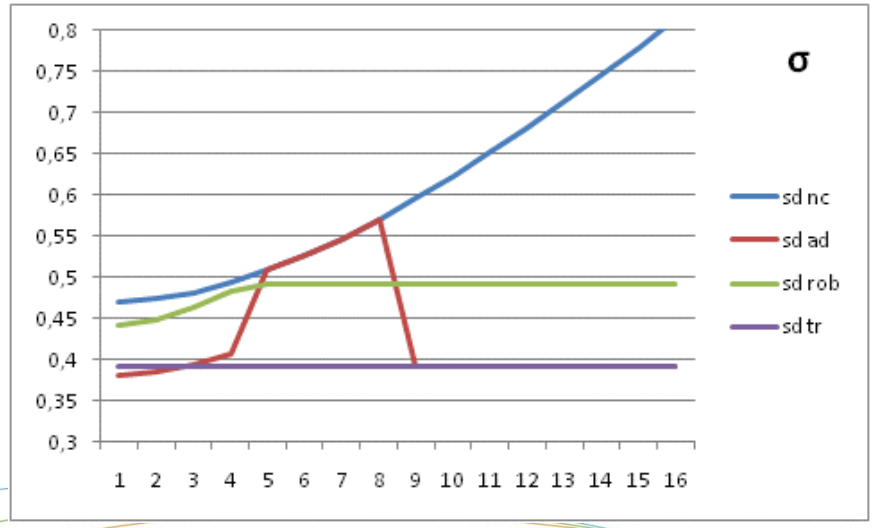




Alg A







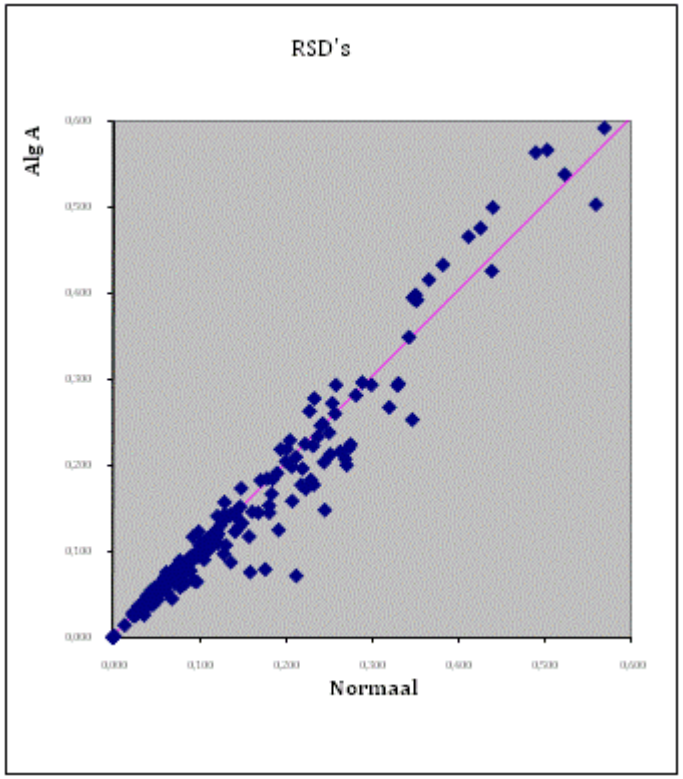
Nieuwe benadering

Wat met niet normaal verdeelde datasets ?

Robuustheid van outliertests ?

Invloed op langjarige kengetallen ?

Gevolg voor resultaten



Algoritme A

- ongevoelig voor normaliteit
- meer voorzichtige behandeling van “uitbijters”
- algemeen beperkte invloed
- soms sterke verschillen