Bayesian hunt for systematics & new signals

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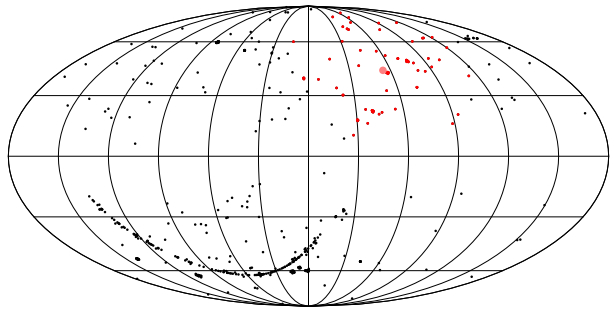
Let's find the biased ones!

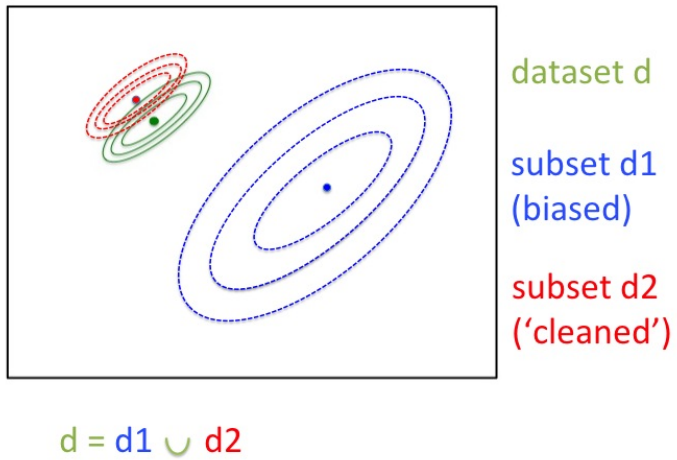


2nd research focus: galaxy clusters and HMF

Dark Cosmology Centre

Robustness: **statistical compatibility** of subsets

$\mathcal{L}$ – contours **shift** and **change size**

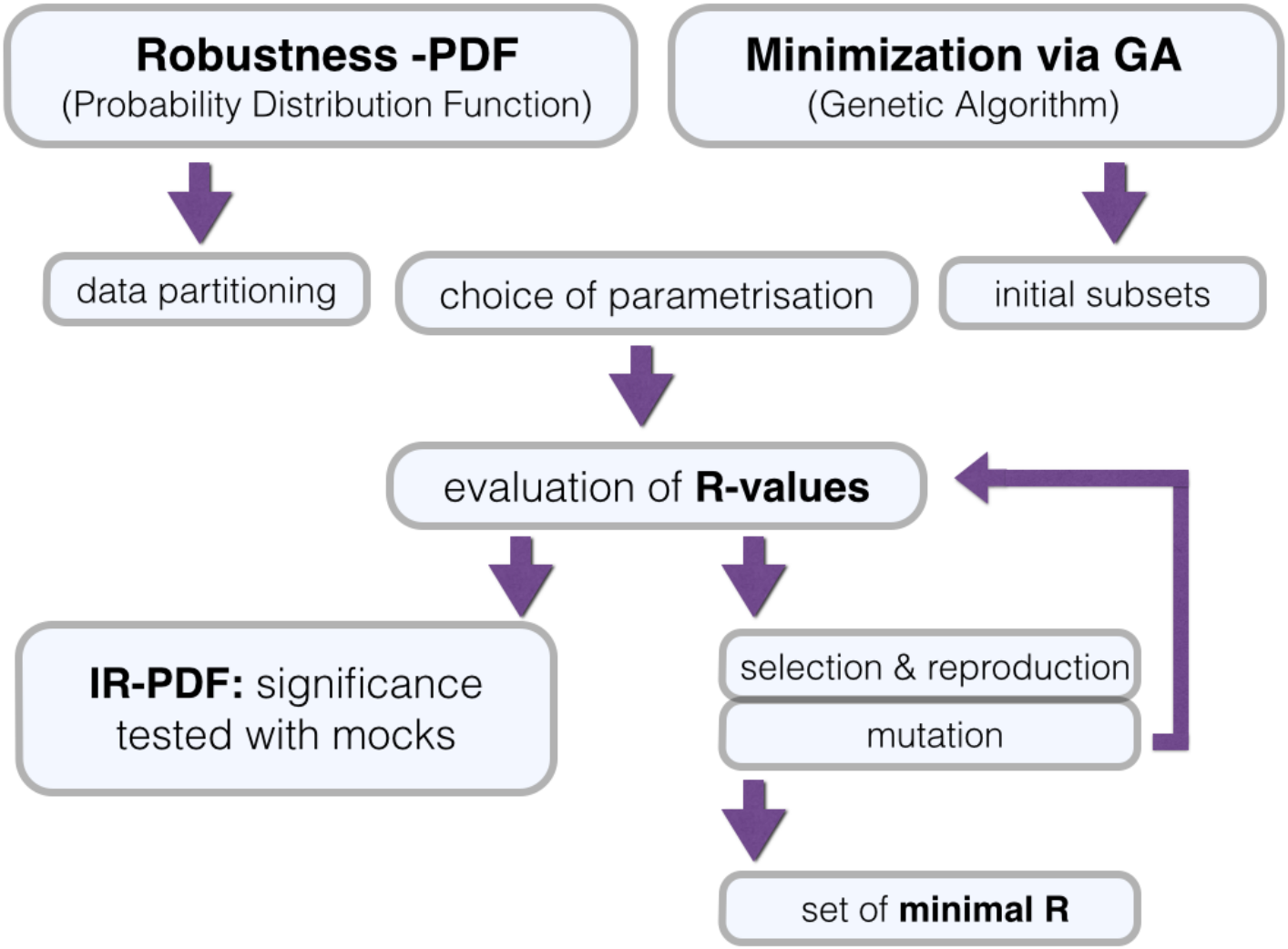


Bayesian comparison: one ⇔ two sets of parameters

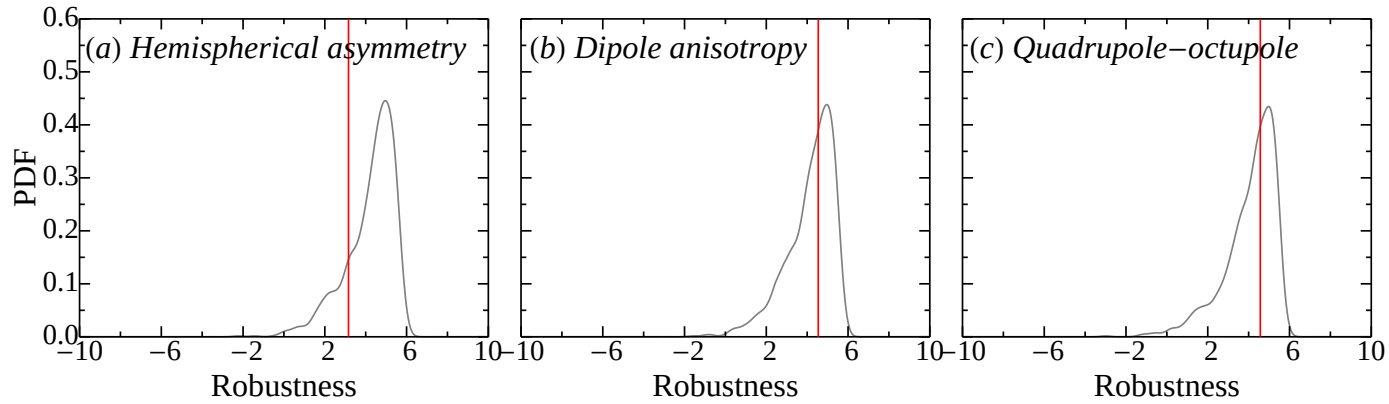
$$\mathcal{B}_{tot,ind} = \frac{\mathcal{E}(d; M_C)}{\mathcal{E}(d_1; M_C)\,\mathcal{E}(d_2; M_S)} \quad \Rightarrow \quad \boxed{R \equiv \log \mathcal{B}_{tot,ind}}$$

Amendola, Quartin, Marra (arXiv:1209.1897)

Significance of deviations and robustness minimization

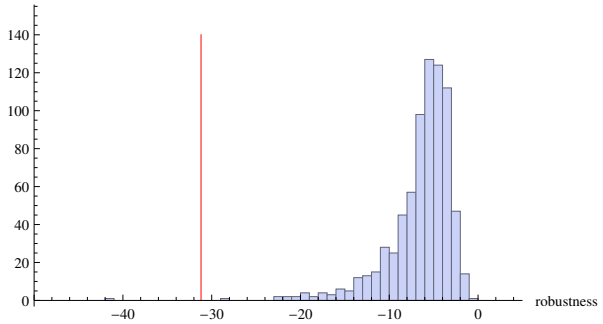


Robustness analysis of specific subsets:



Heneka, Marra, Amendola (arXiv:1310.8435)

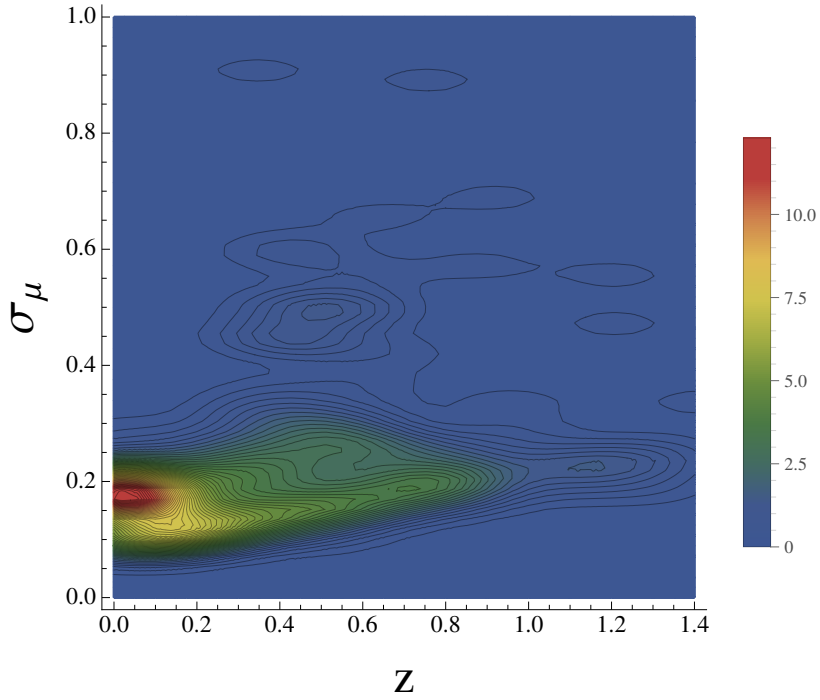
Robustness analysis of distance modulus errors:



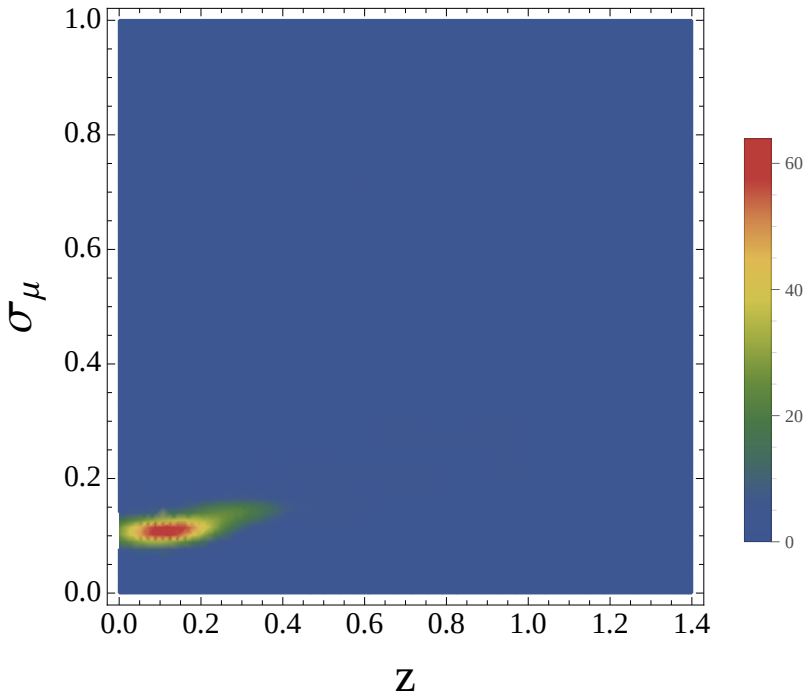
Distribution of least robust SNe

Random search (left) and GA-minimization (right)

R≈ -31



R≈ -283



Robust, but room for improvement!

advantages

- no specific model/effect has to be assumed
- Bayesian approach using full likelihood information

application

- improve understanding of systematics and correlations
- find most probable incompatible subset of ANY data

in progress

- test further dependencies of SN properties
- apply to other data than SNe