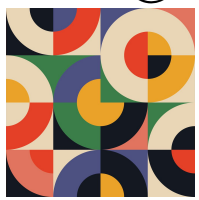
Wizualizacja danych

Wykład 3: Fundamentalne zasady projektowania graficznego

Mariusz Tarnopolski

Instytut Astronomii UMK

DataViz ©2024





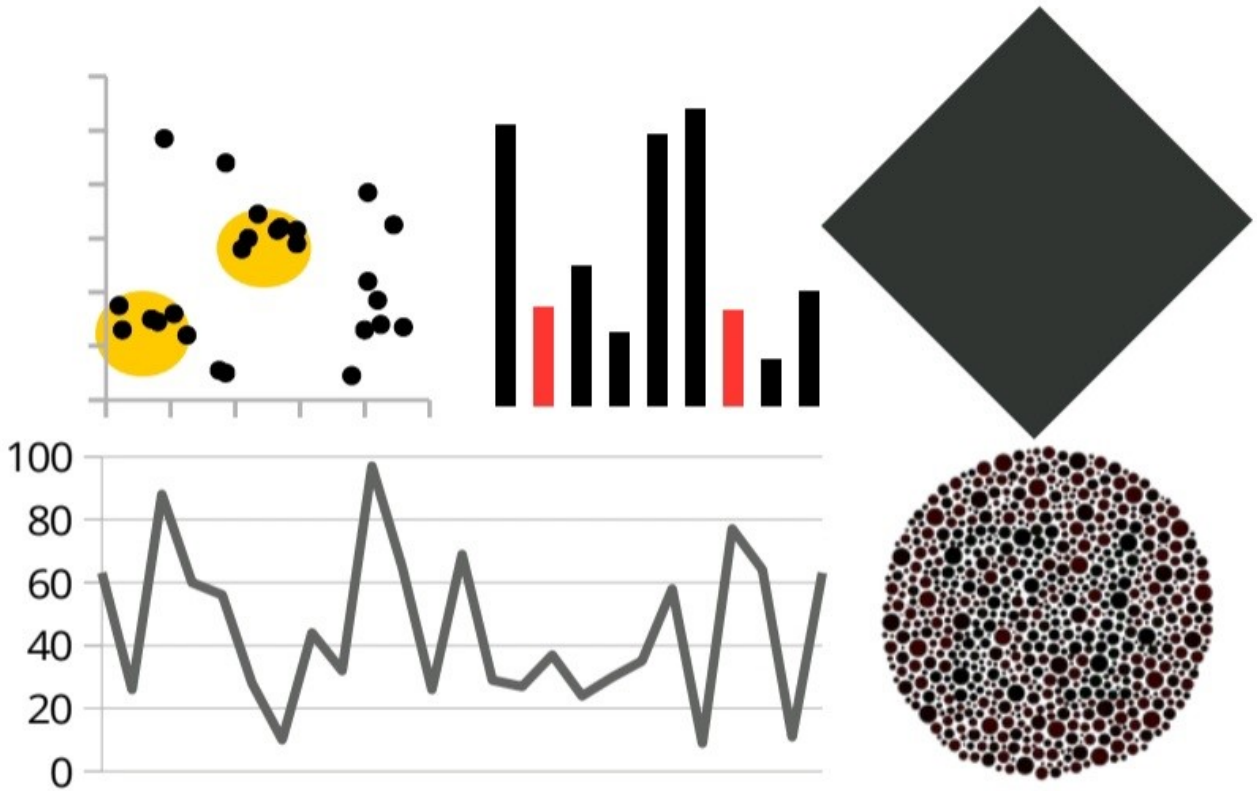
https://brandingbyjuls.com/blog/f/12-essential-graphic-design-principles-you-need-to-know; https://www.zekagraphic.com/12-principles-of-graphic-design/

- W tradycyjnym projektowaniu graficznym (postery, ulotki, czasopisma, web dev) wszelkie ozdobniki (tj. elementy estetyczno-artystyczne) mają wzbudzać emocje, wywoływać skojarzenia, wyrażać ukryty przekaz itp.
- W DataViz nie ma miejsca na żadne ozdobniki: każdy element wykresu ma ilustrować dane/tezę lub ew. ułatwiać odbiorcy interpretację.
- Wg Tuftego celem jest maksymalizacja *data-to-ink ratio*.

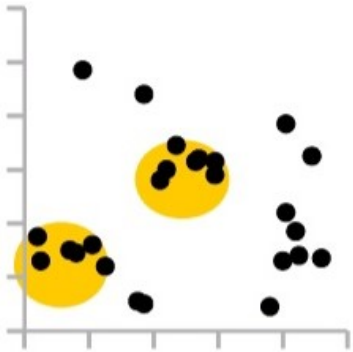
- W tradycyjnym projektowaniu graficznym (postery, ulotki, czasopisma, web dev) wszelkie ozdobniki (tj. elementy estetyczno-artystyczne) mają wzbudzać emocje, wywoływać skojarzenia, wyrażać ukryty przekaz itp.
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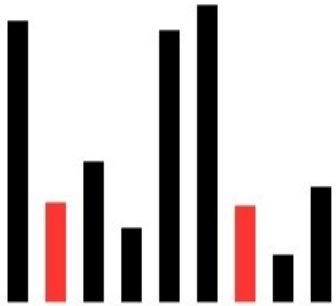
- W tradycyjnym projektowaniu graficznym (postery, ulotki, czasopisma, web dev) wszelkie ozdobniki (tj. elementy estetyczno-artystyczne) mają wzbudzać emocje, wywoływać skojarzenia, wyrażać ukryty przekaz itp.
- W DataViz nie ma miejsca na żadne ozdobniki: każdy element wykresu ma ilustrować dane/tezę lub ew. ułatwiać odbiorcy interpretację.
- Wg Tuftego celem jest maksymalizacja *data-to-ink ratio*.

Balans



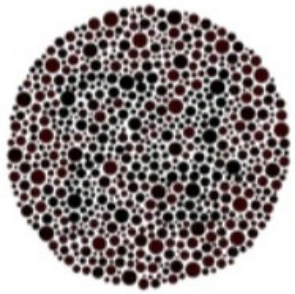
Balans



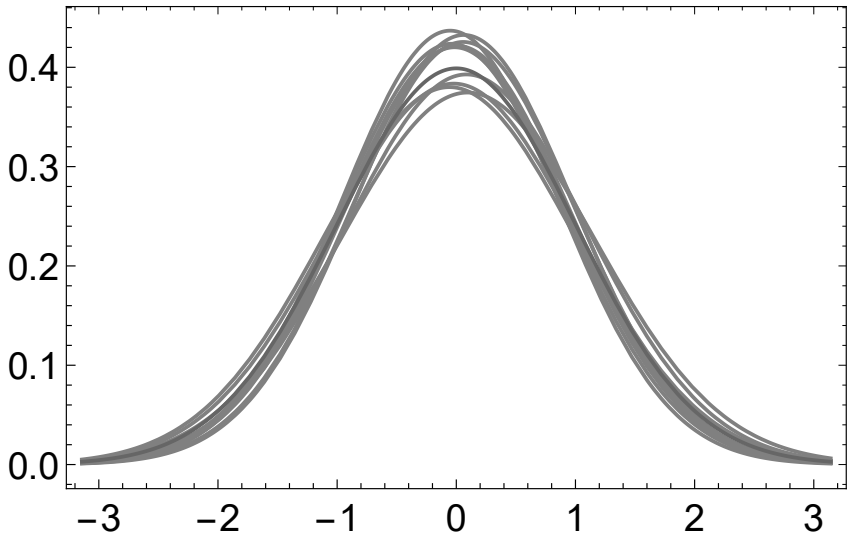




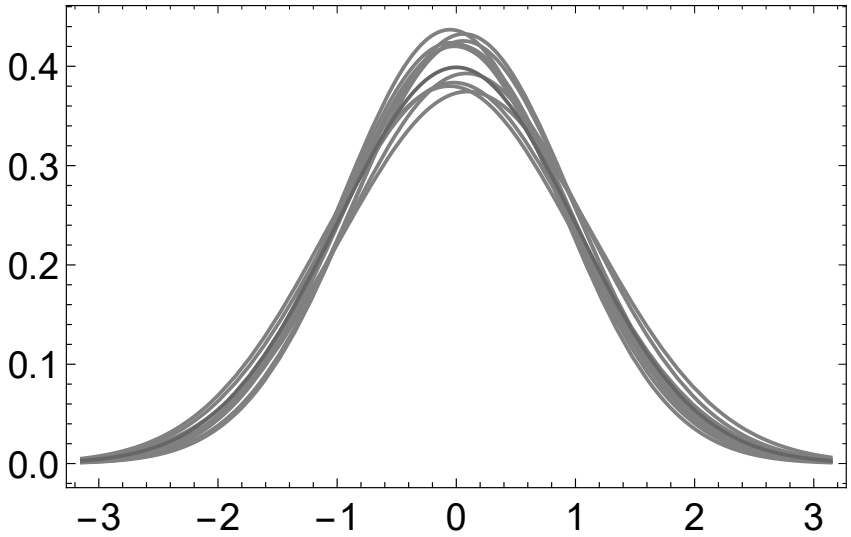


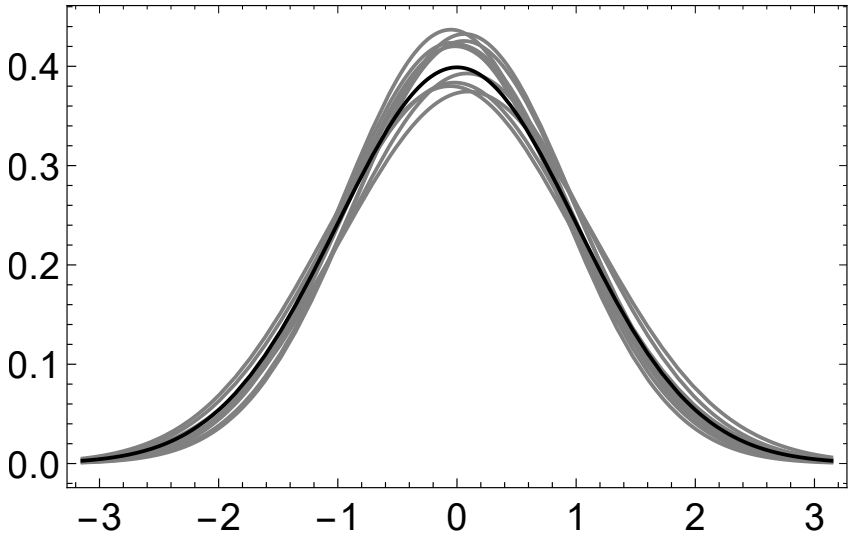


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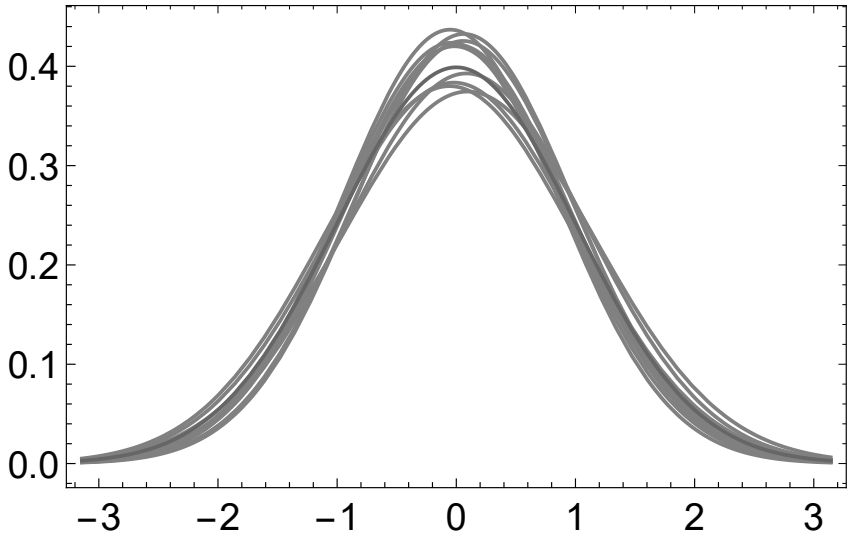


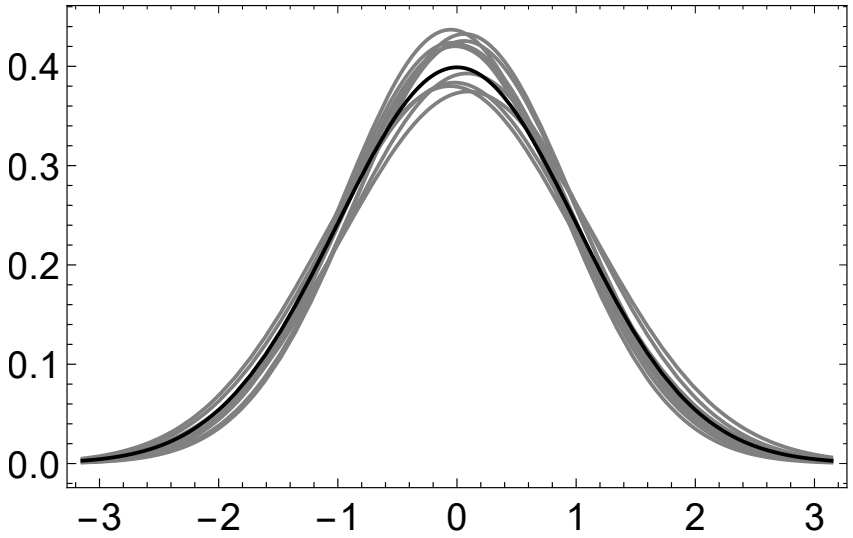
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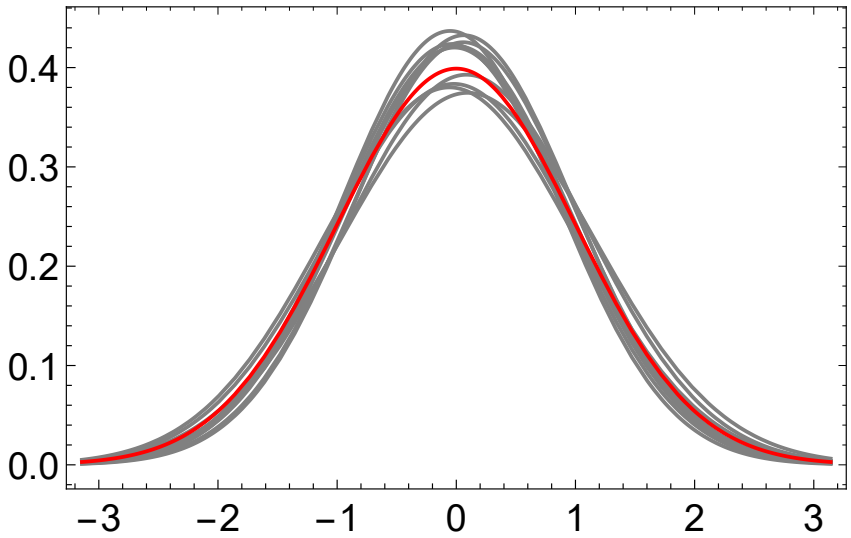




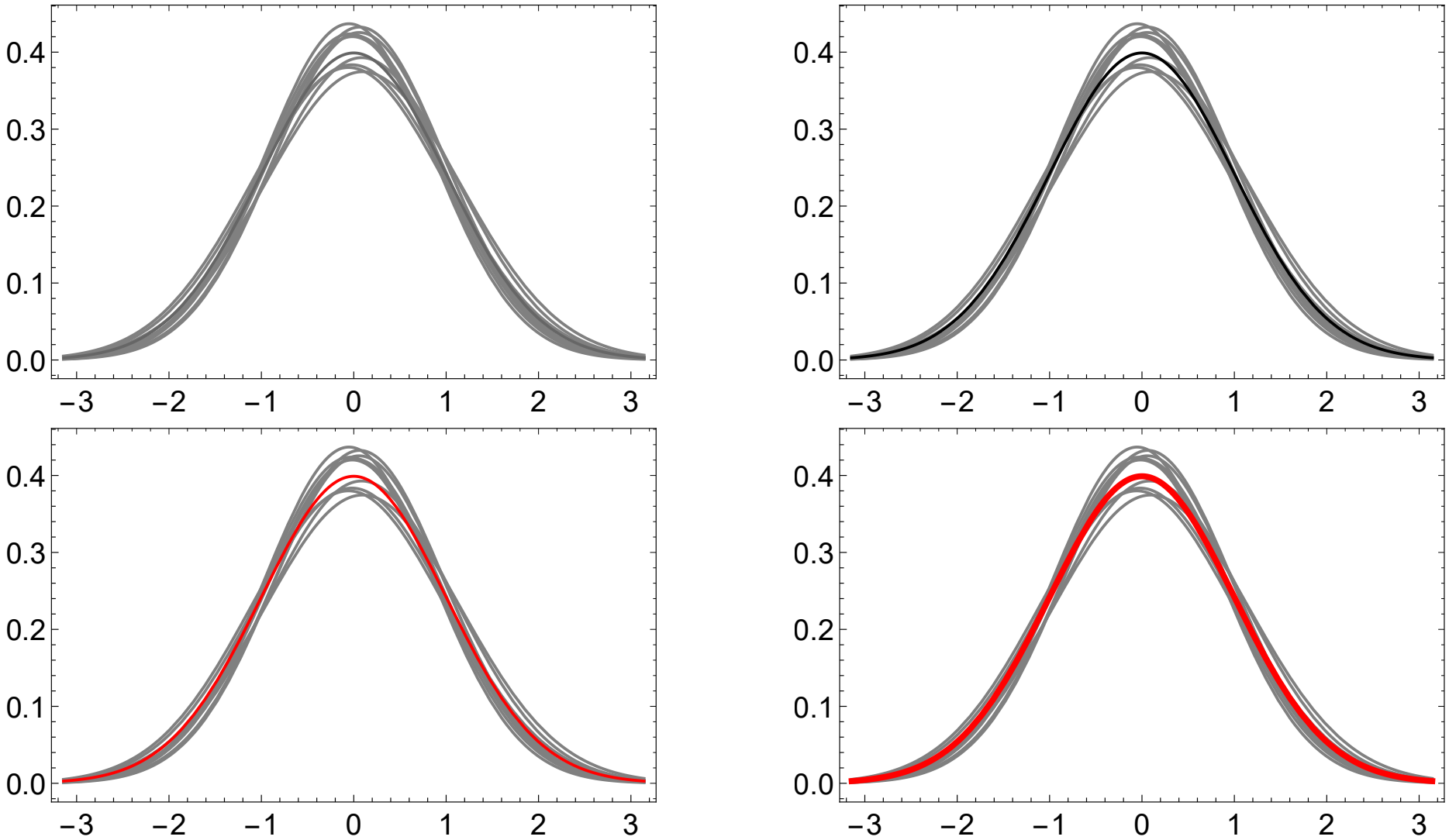
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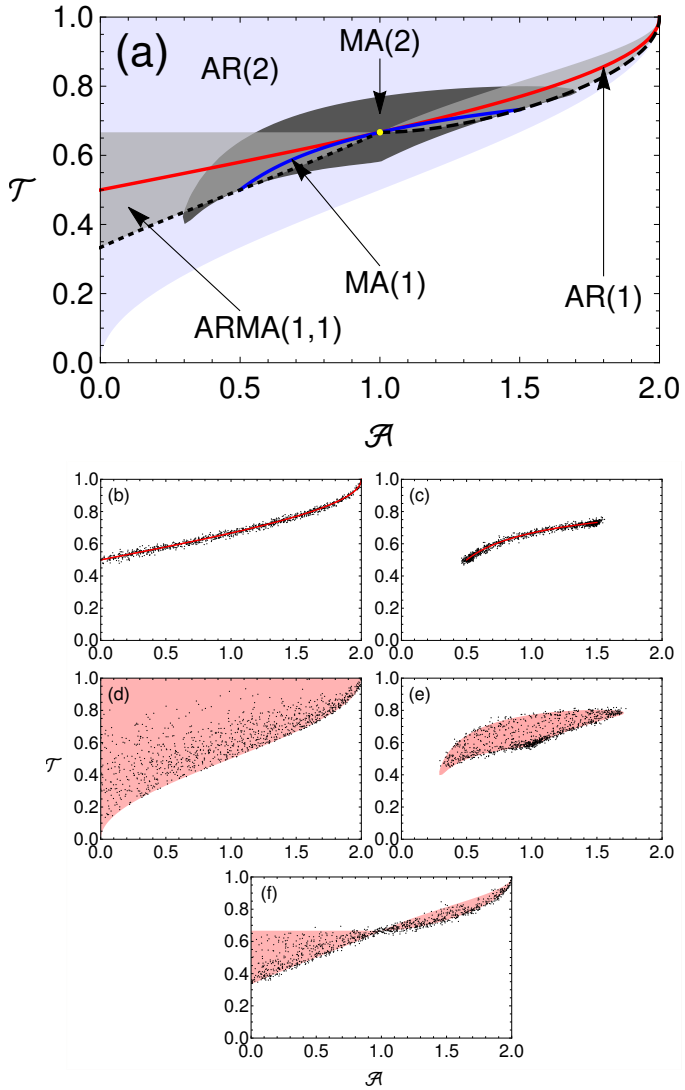




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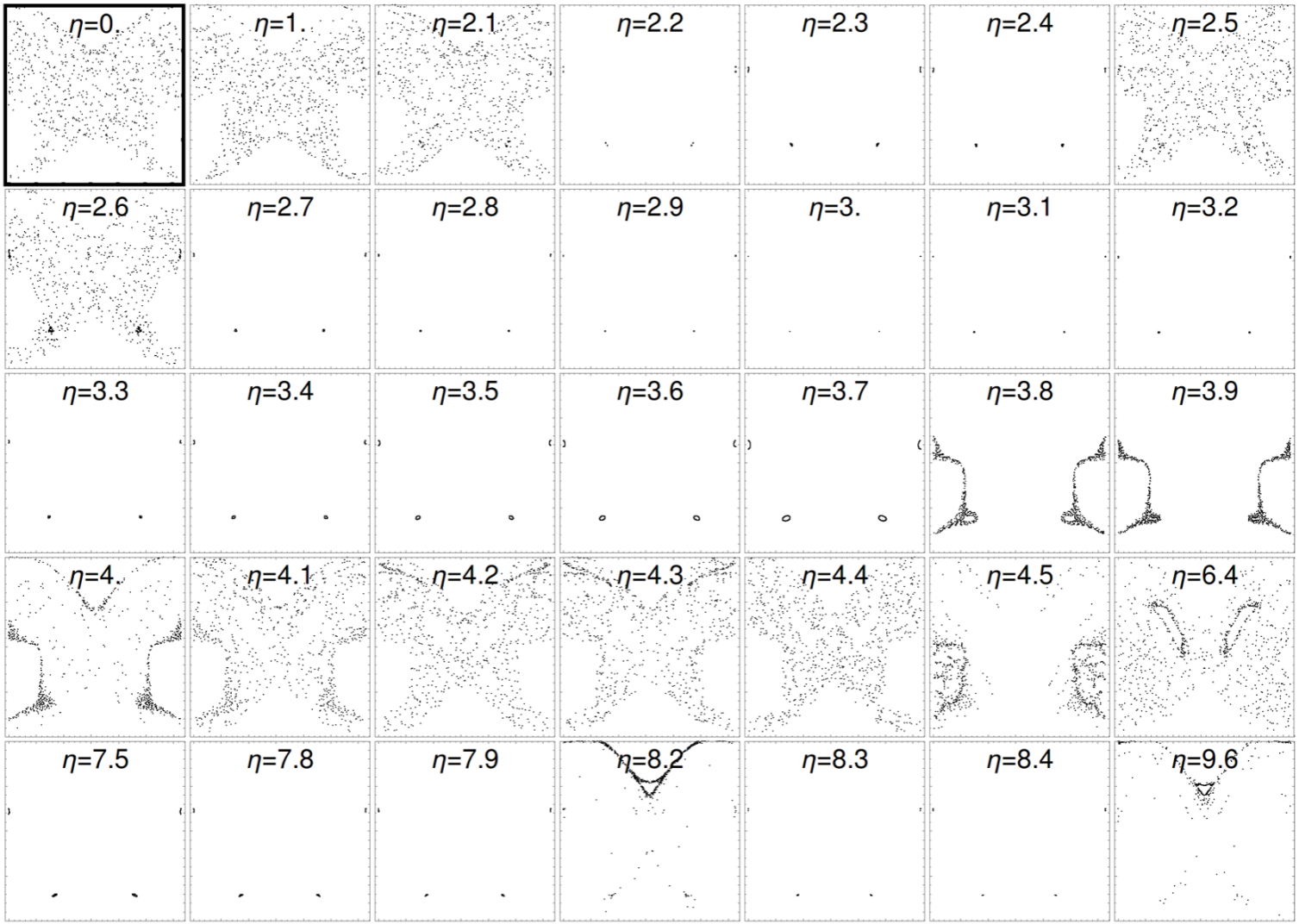


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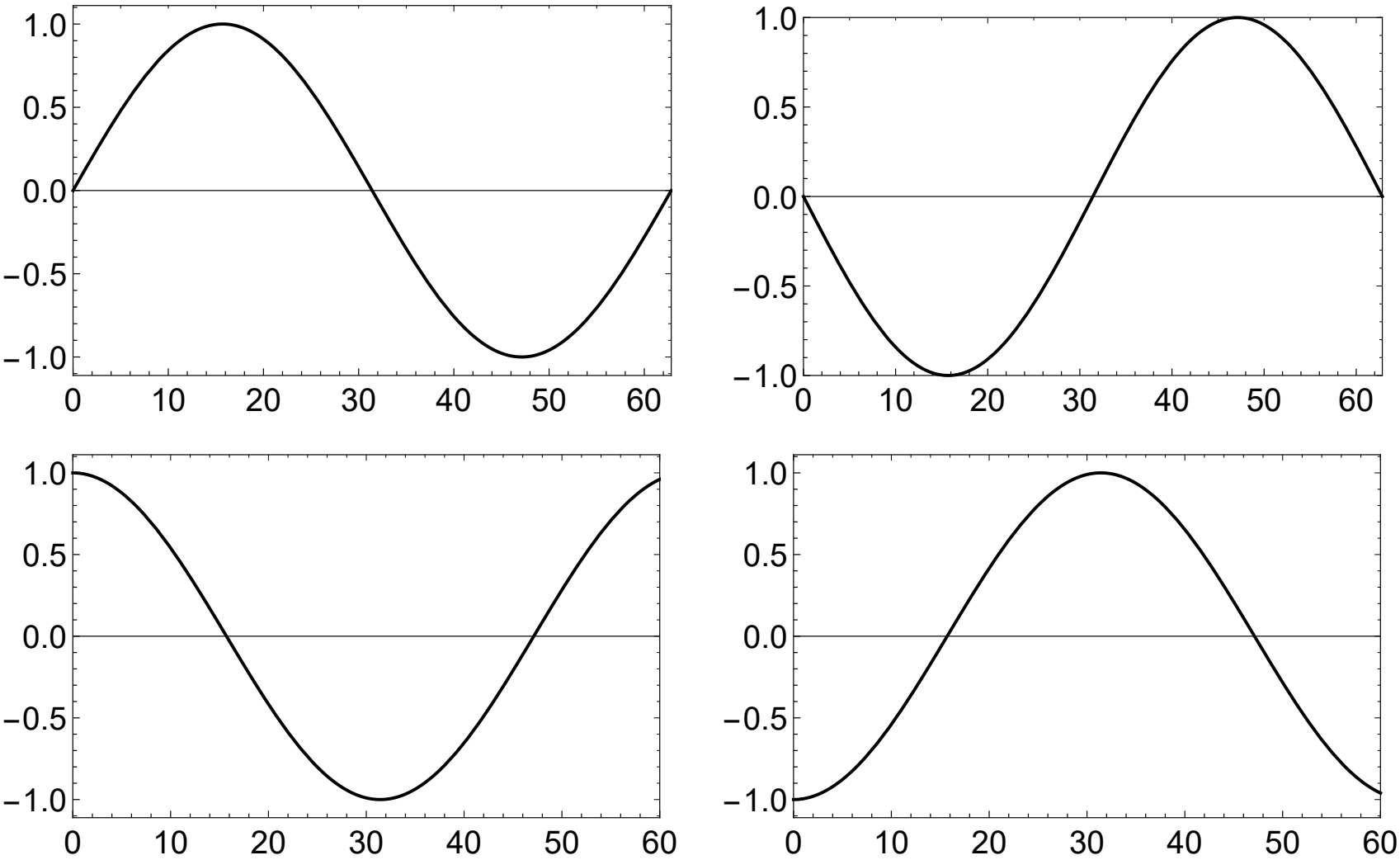
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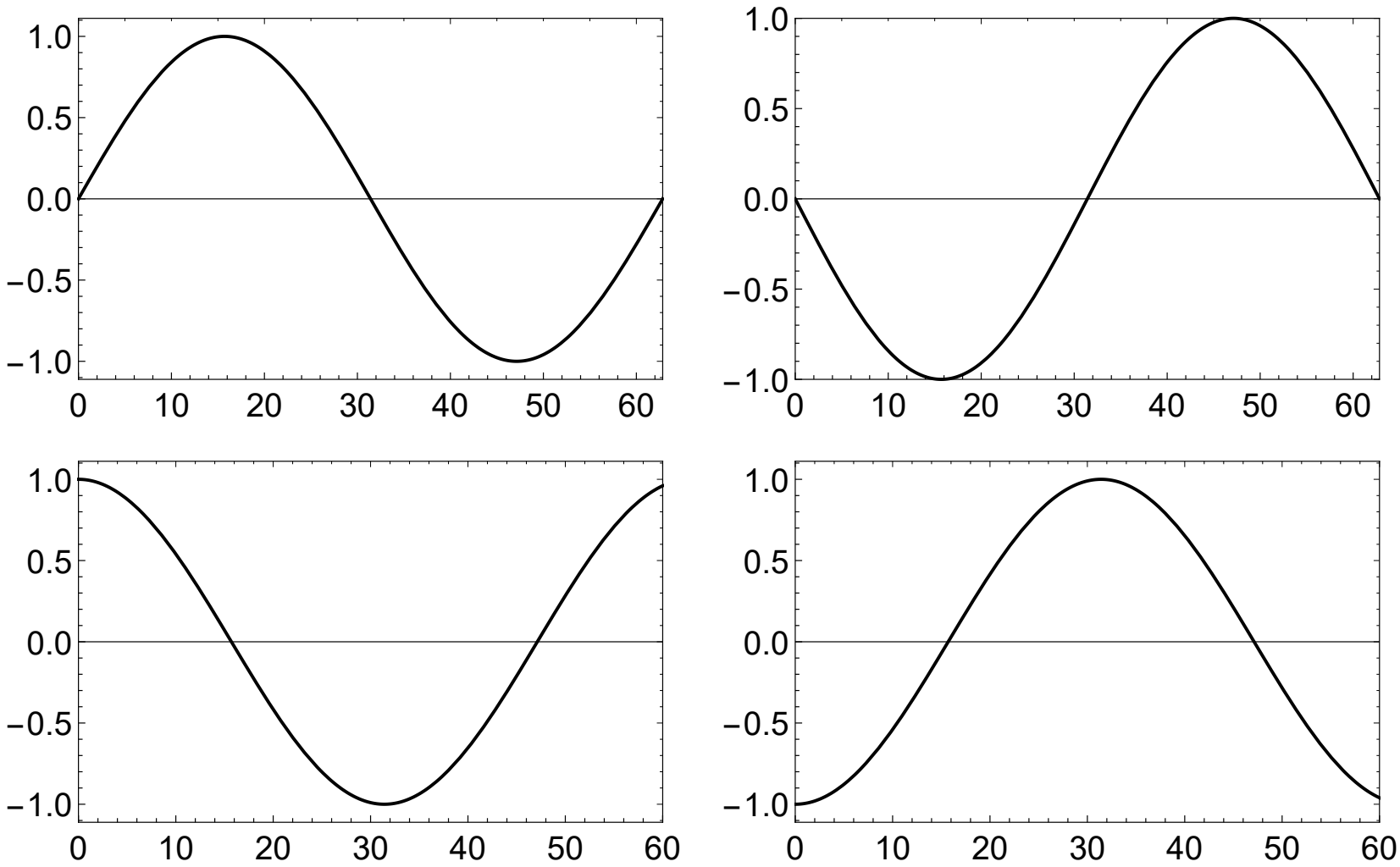


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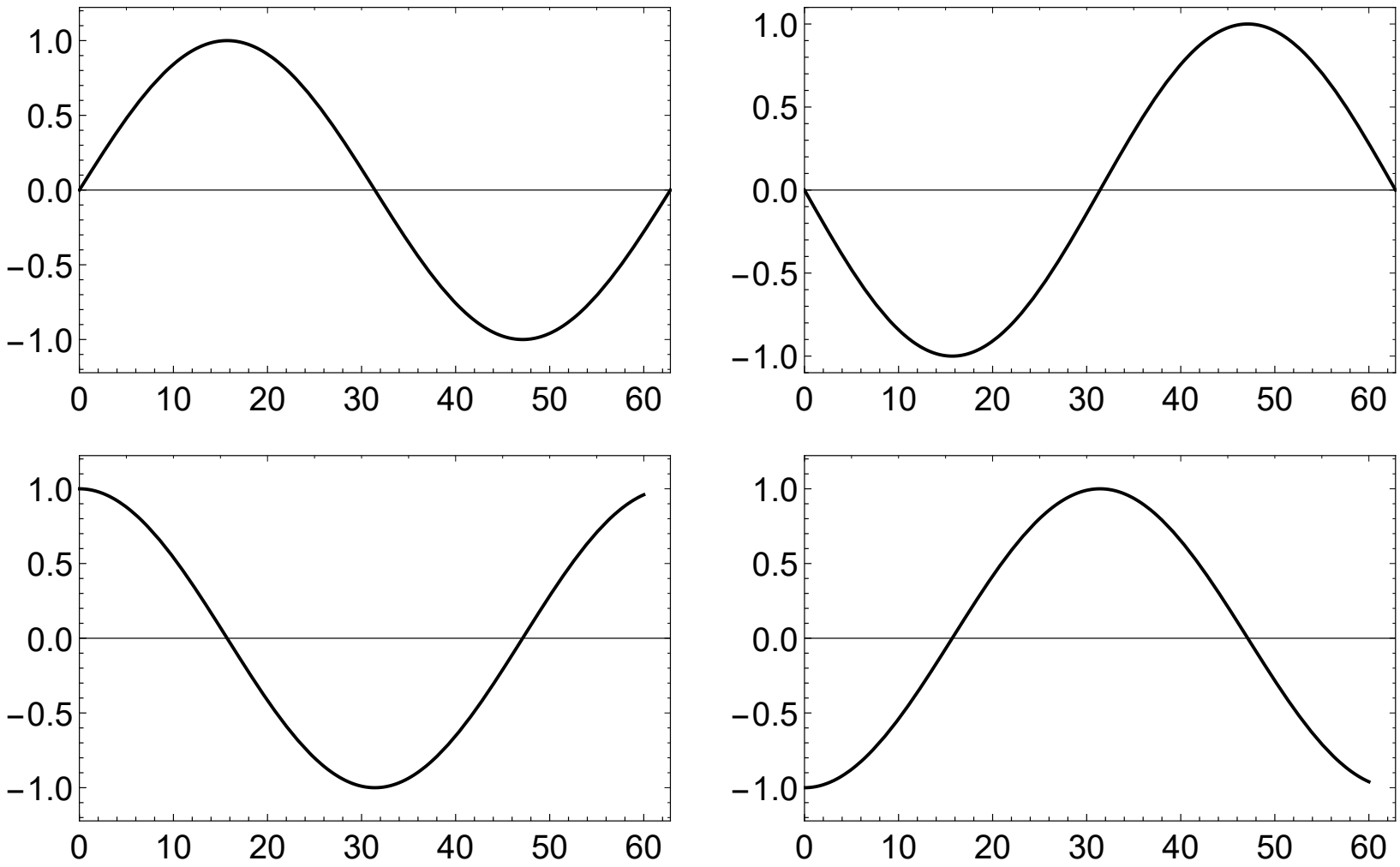
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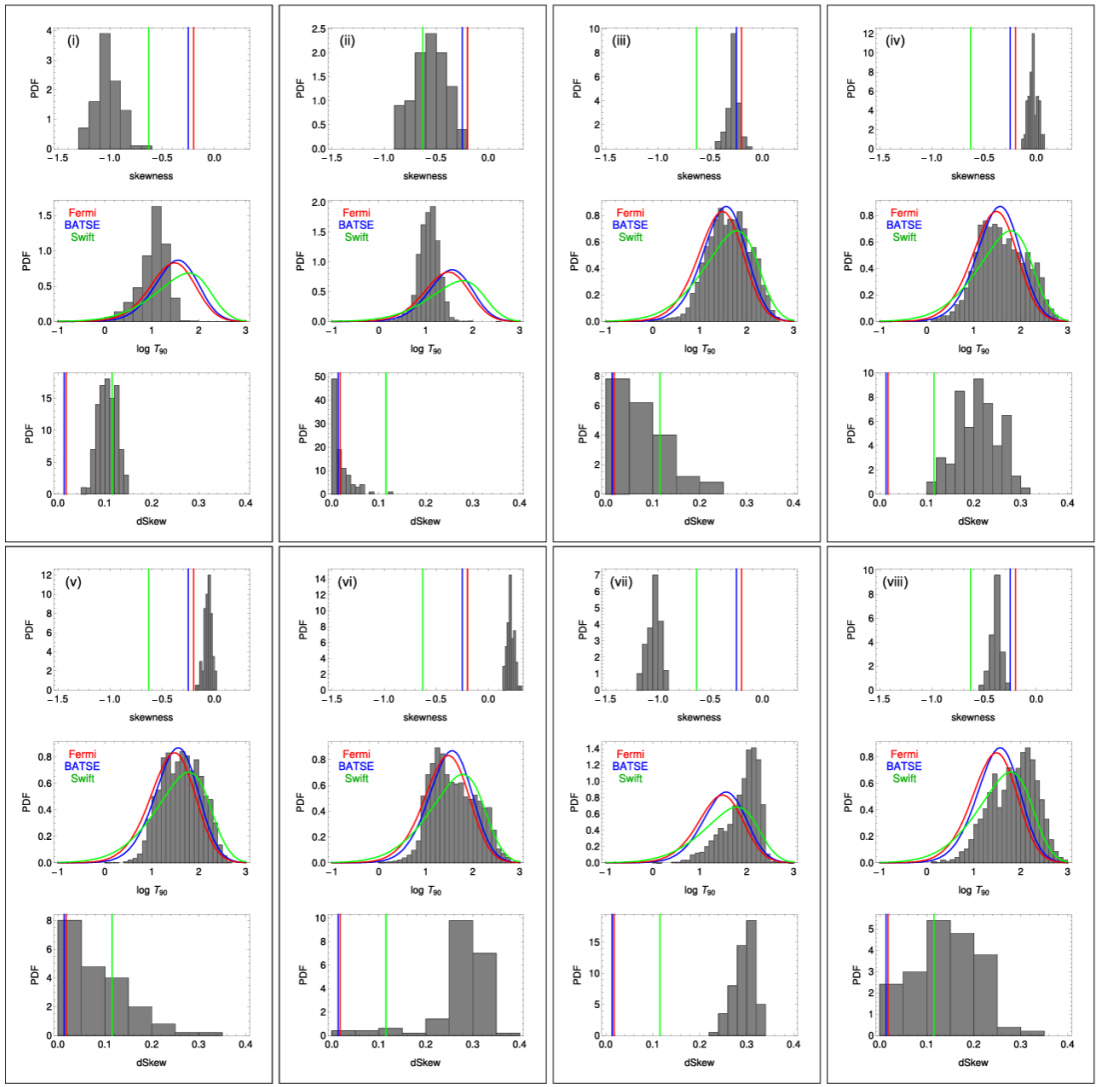
Wyrównanie



Wyrównanie

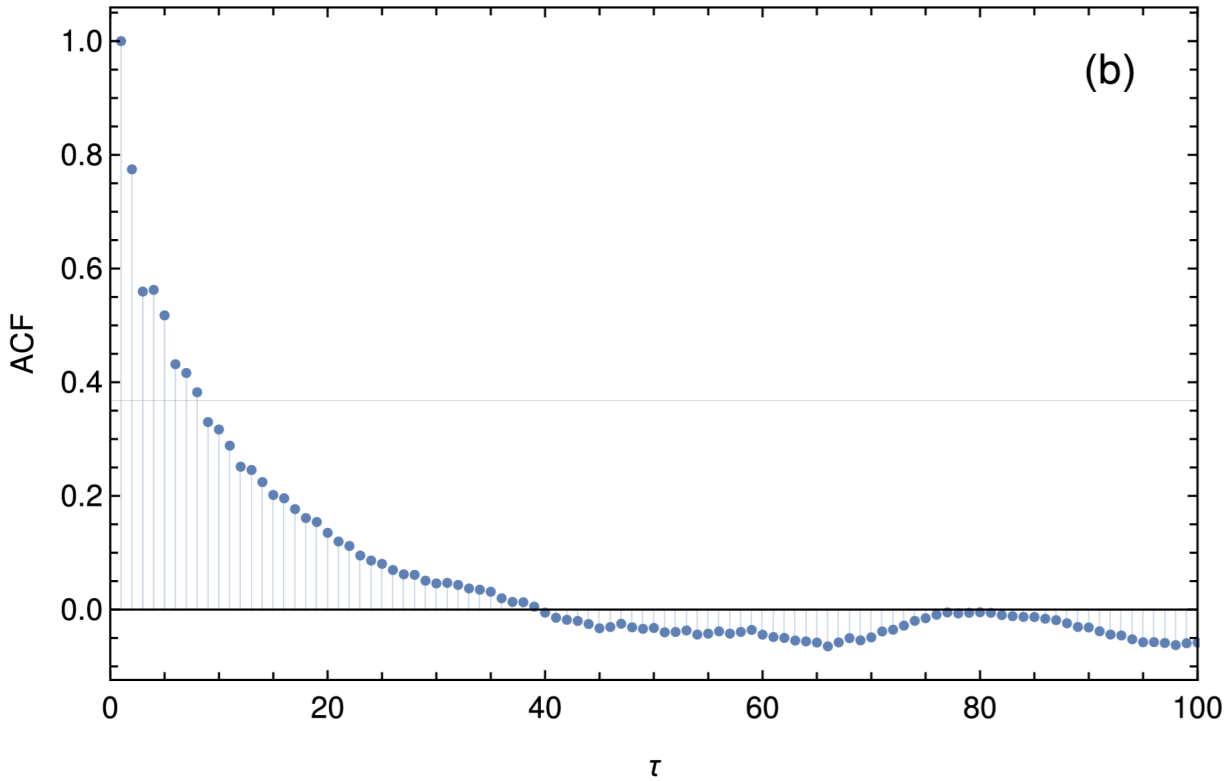


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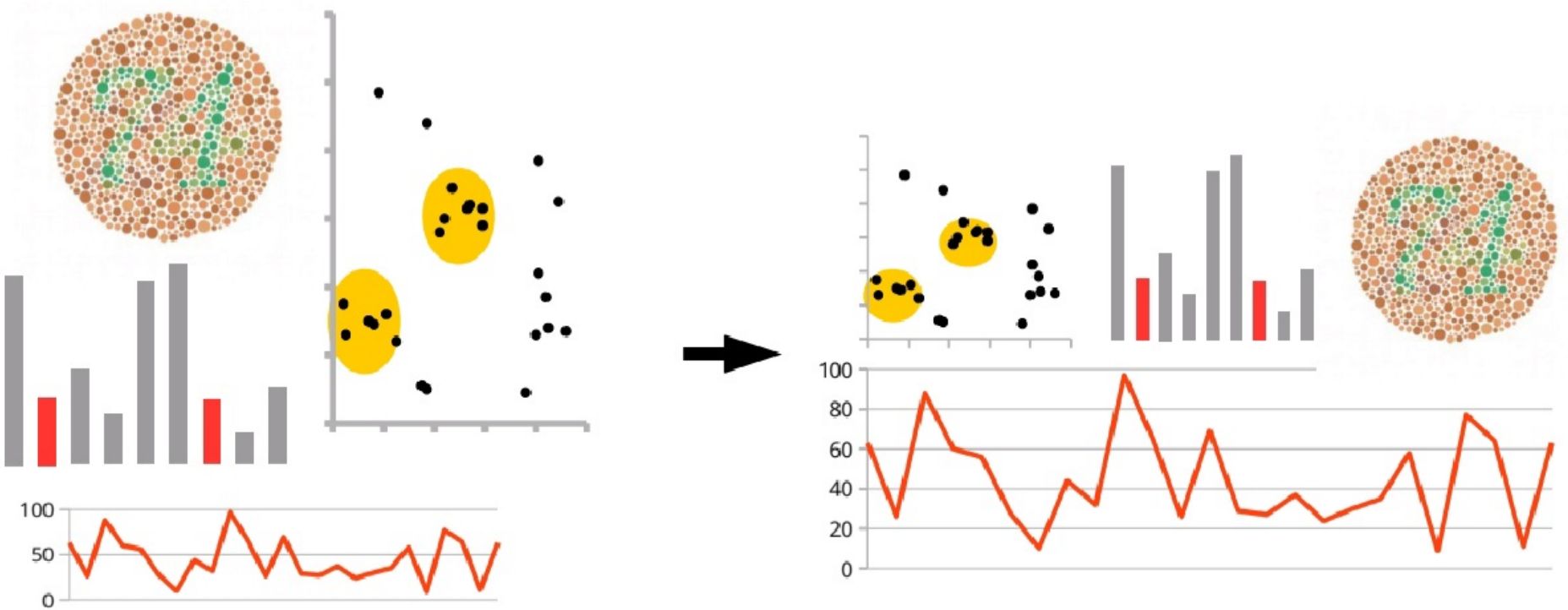
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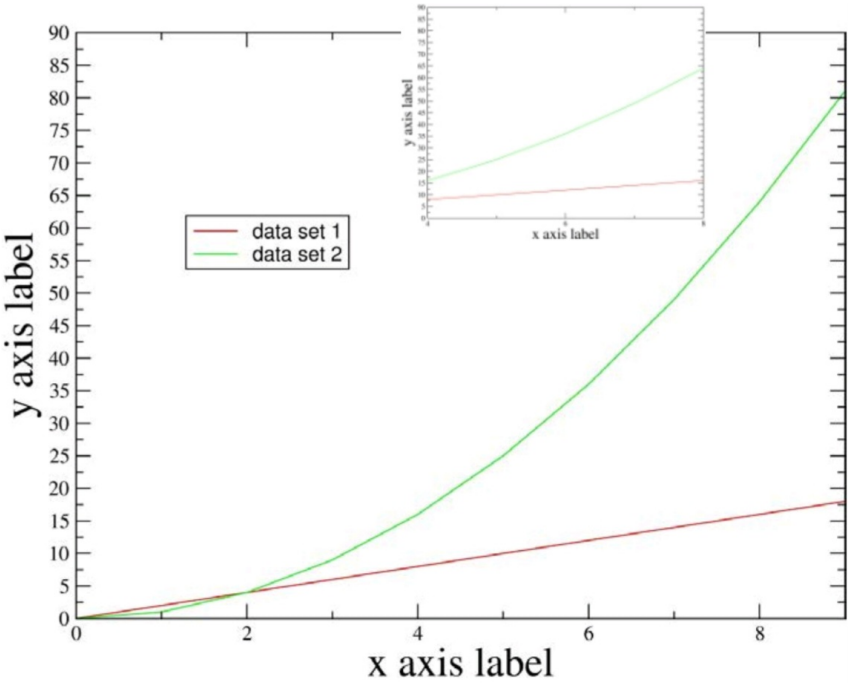


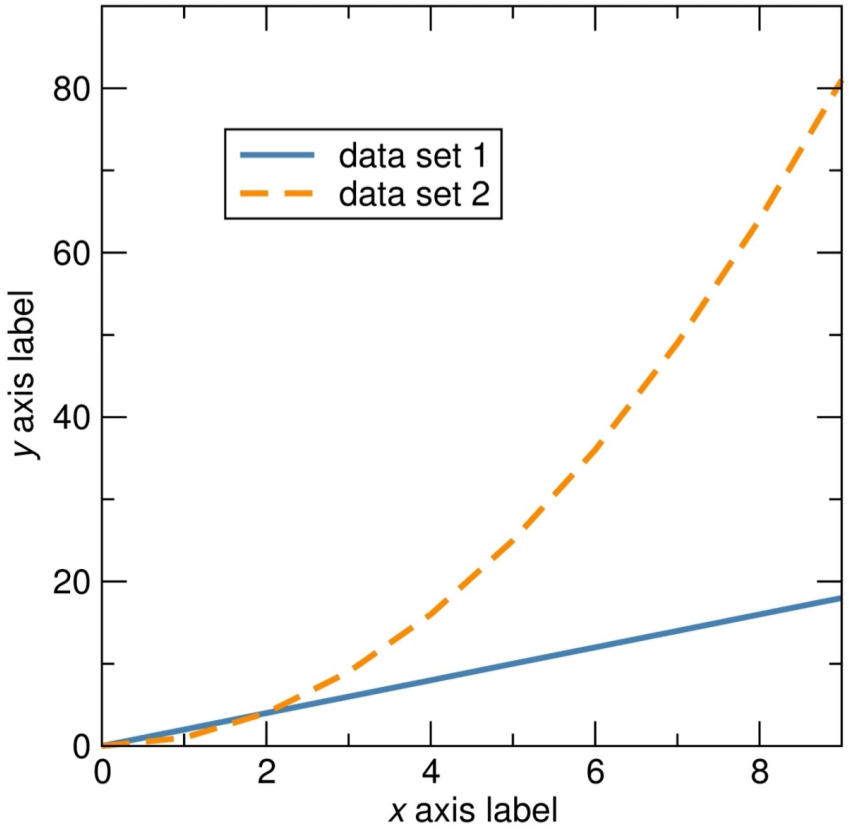
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Kompozycja

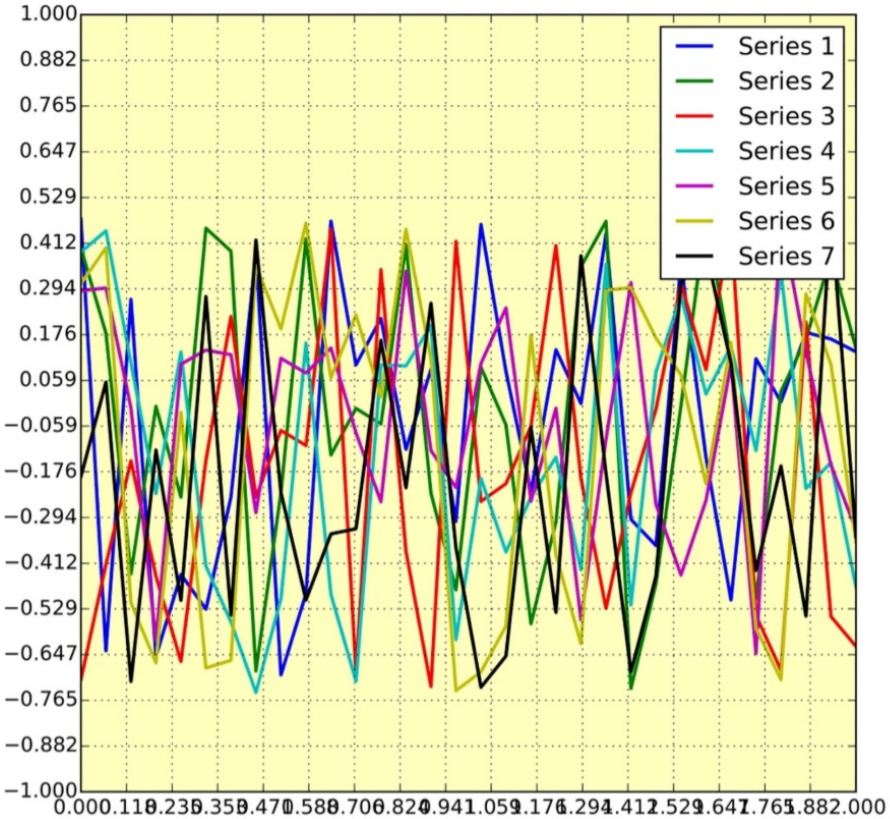


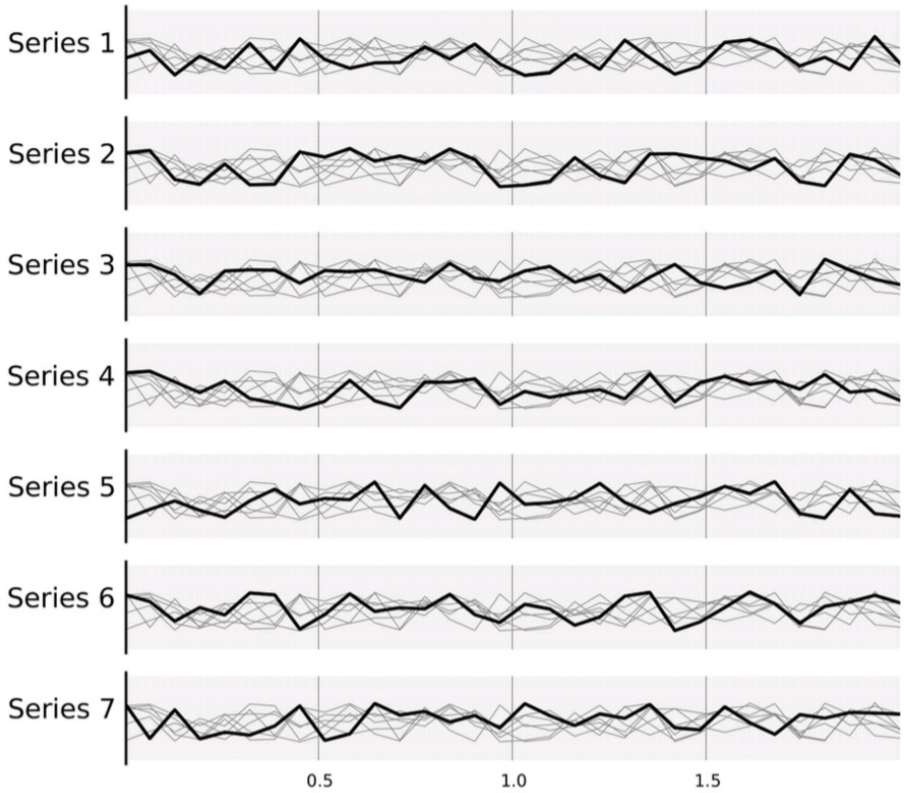
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x axis label
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data set 2
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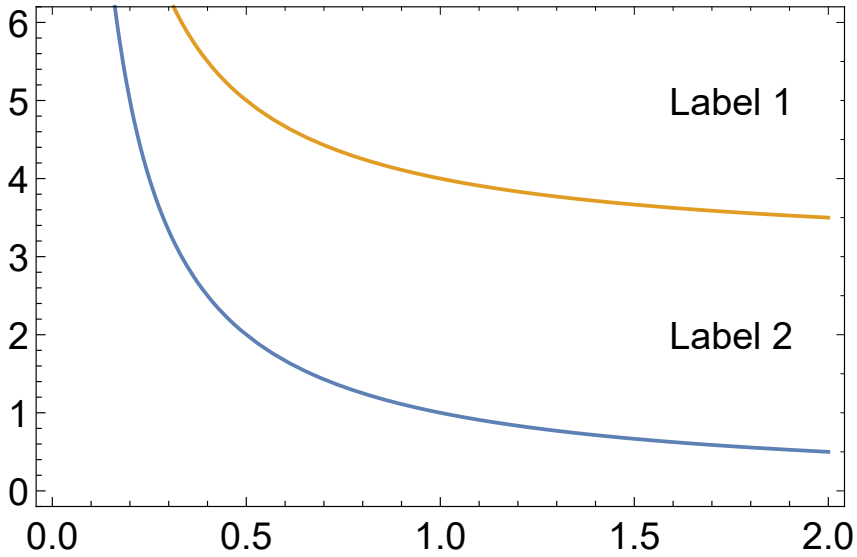

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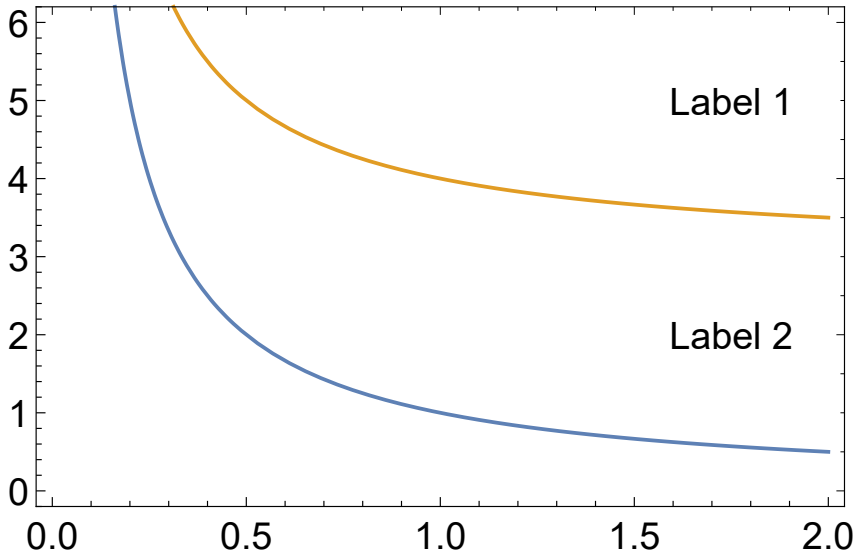

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Series 3
Series 4
Series 5
Series 6
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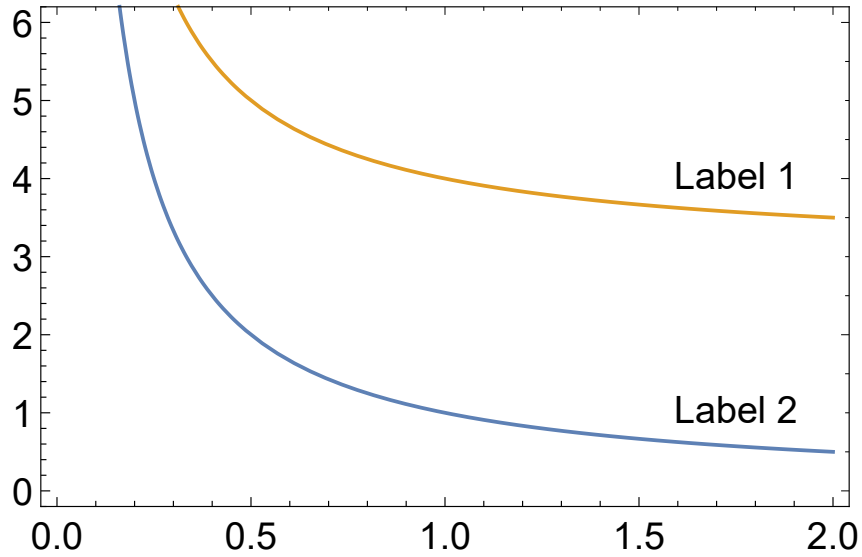

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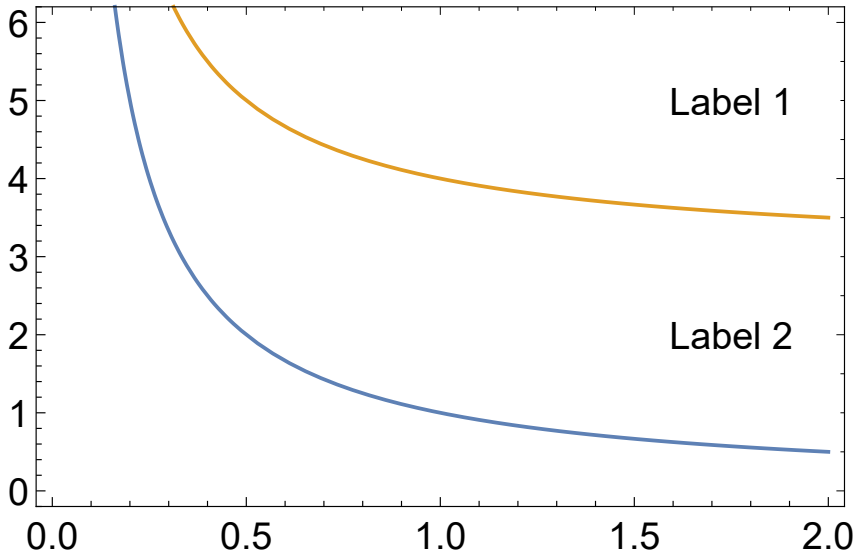


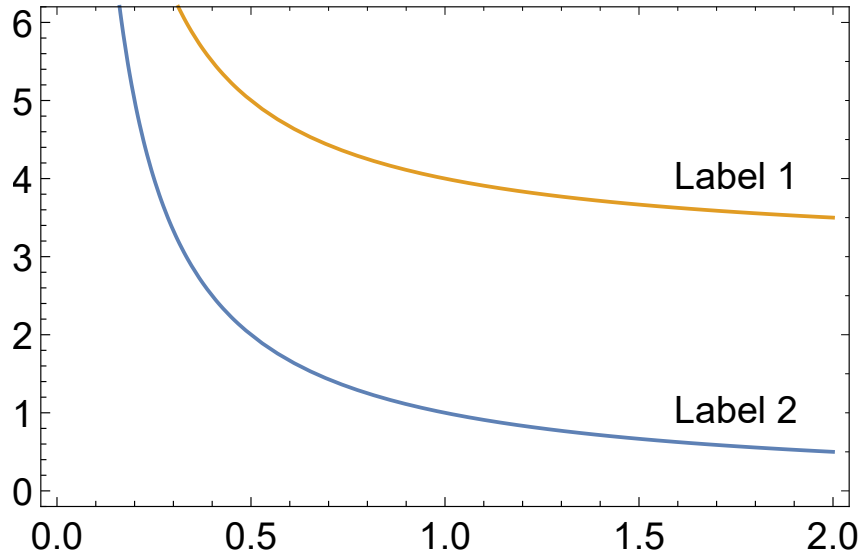
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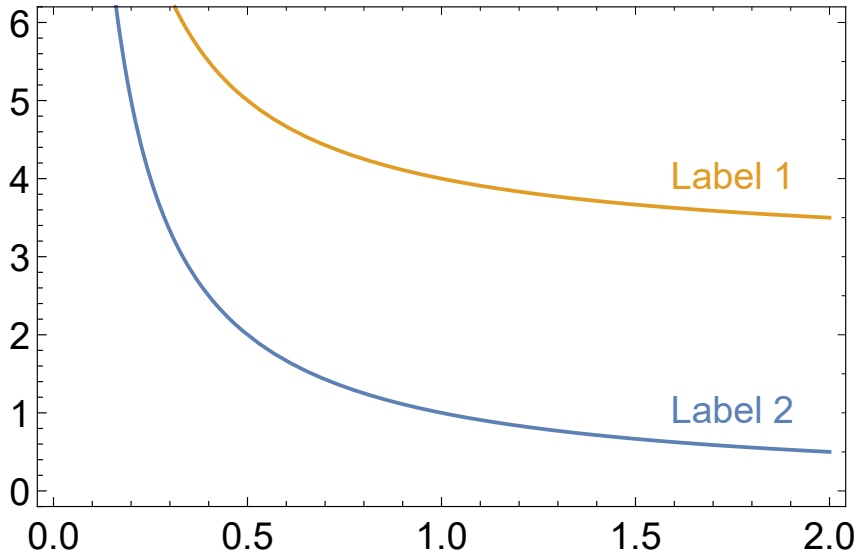

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Label 2


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2
1
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0.5
1.0
1.5
2.0
Label 1
Label 2

Bliskość


Label 1
Label 2
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1
2
3
4
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6
0.0
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2.0


Label 1
Label 2
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6
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1.0
1.5
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Label 1
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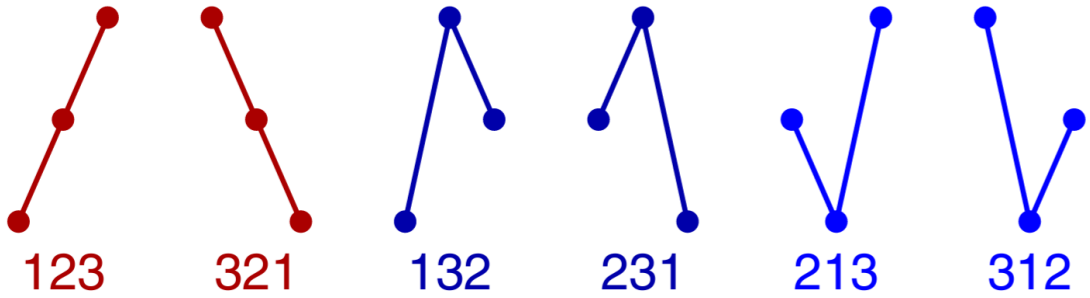
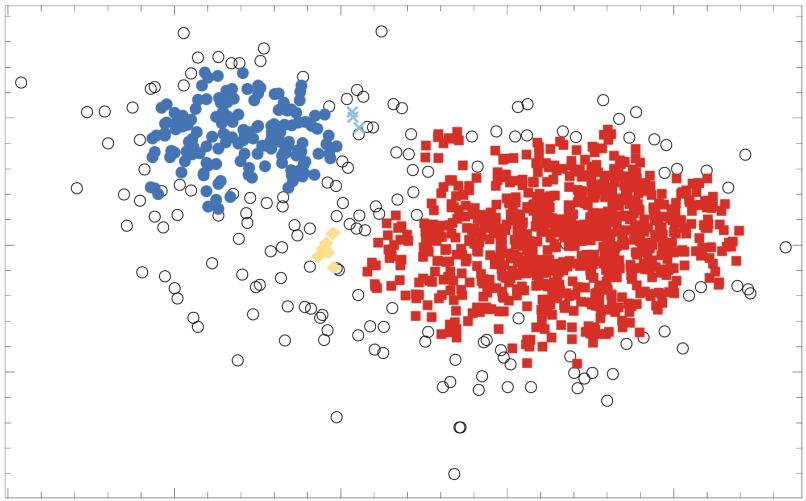


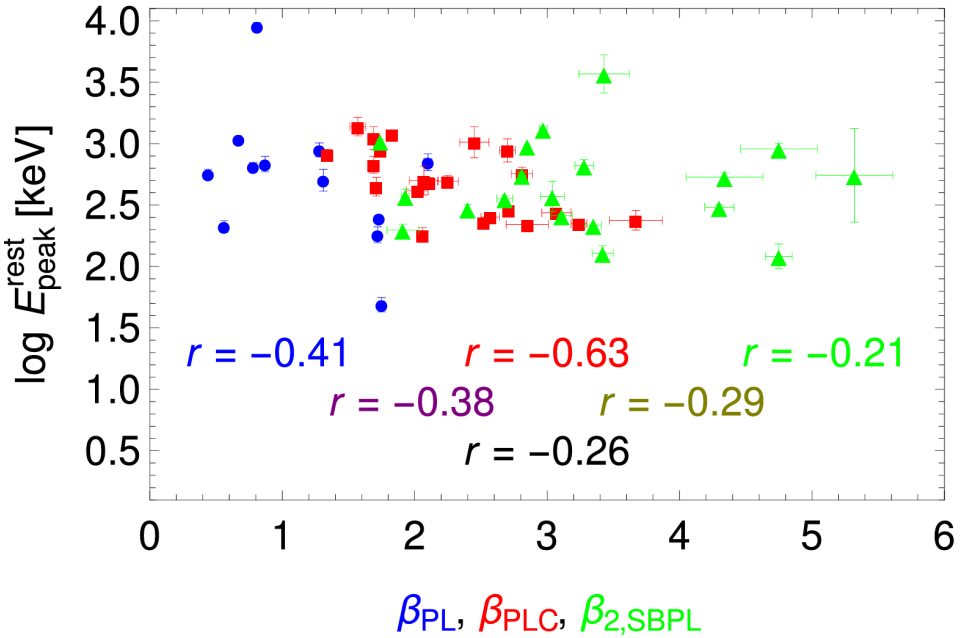
FIG. 1. Order patterns for three points.

https://doi.org/10.1103/PhysRevE.100.062144

Kształt

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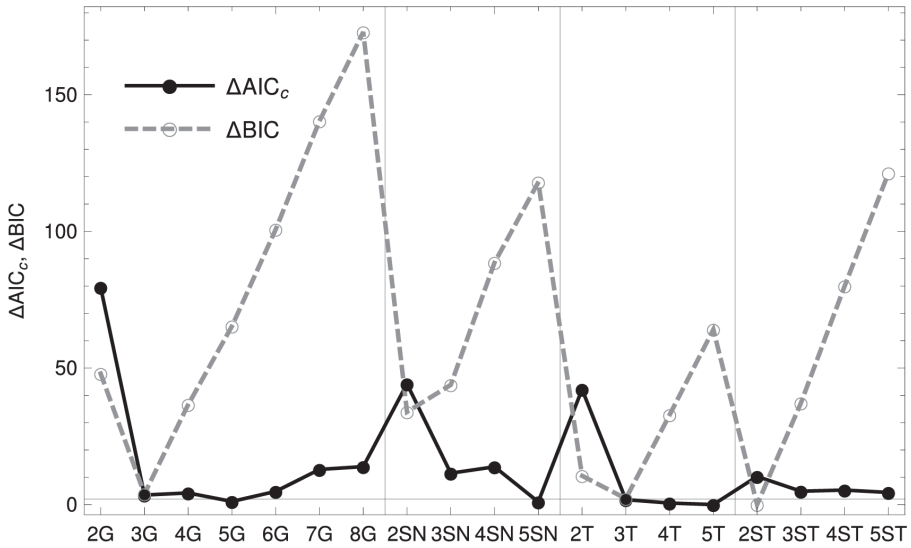


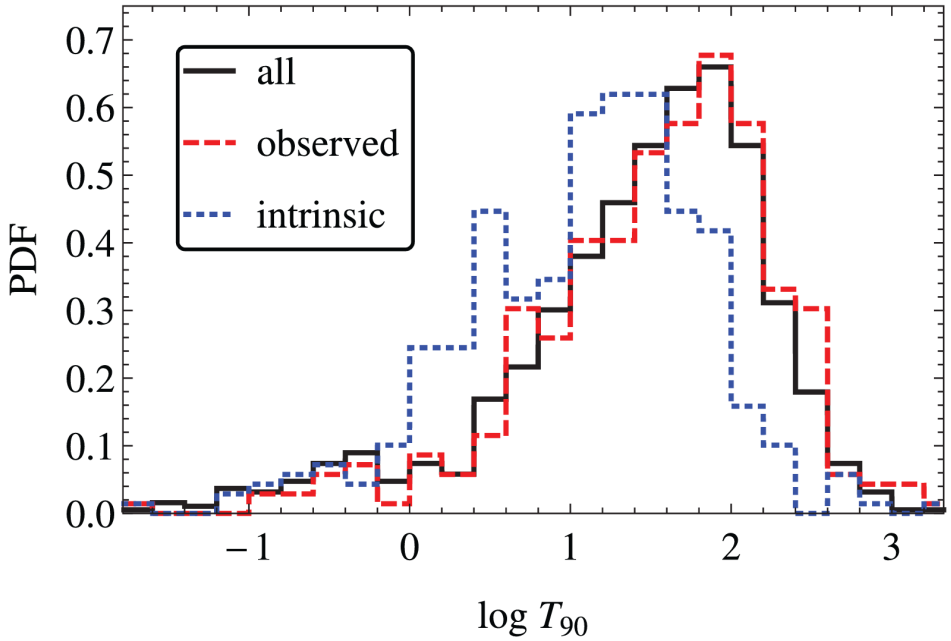


https://doi.org/10.1051/0004-6361/202038645;
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Kształt

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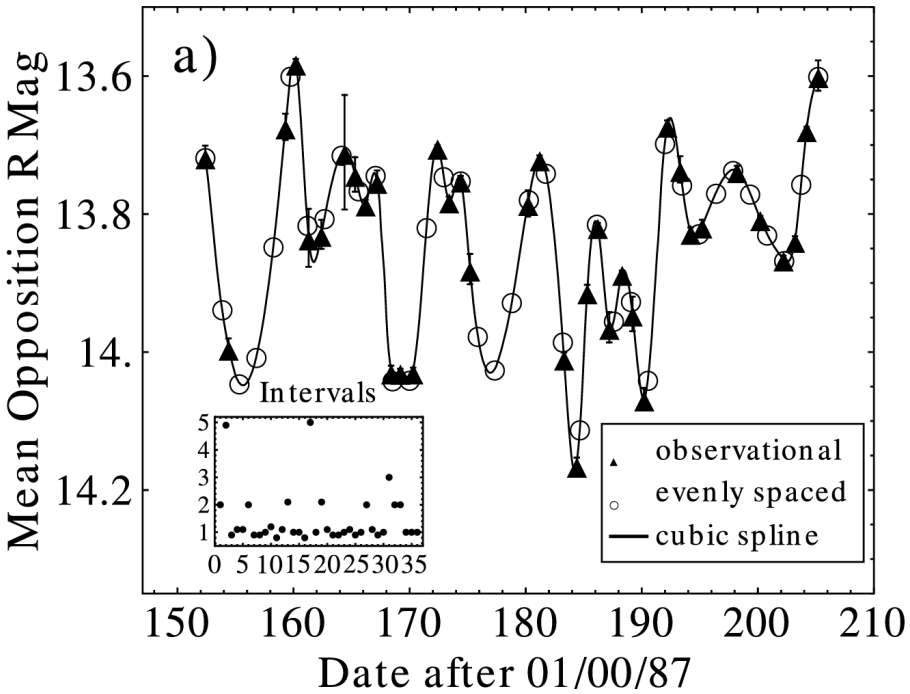


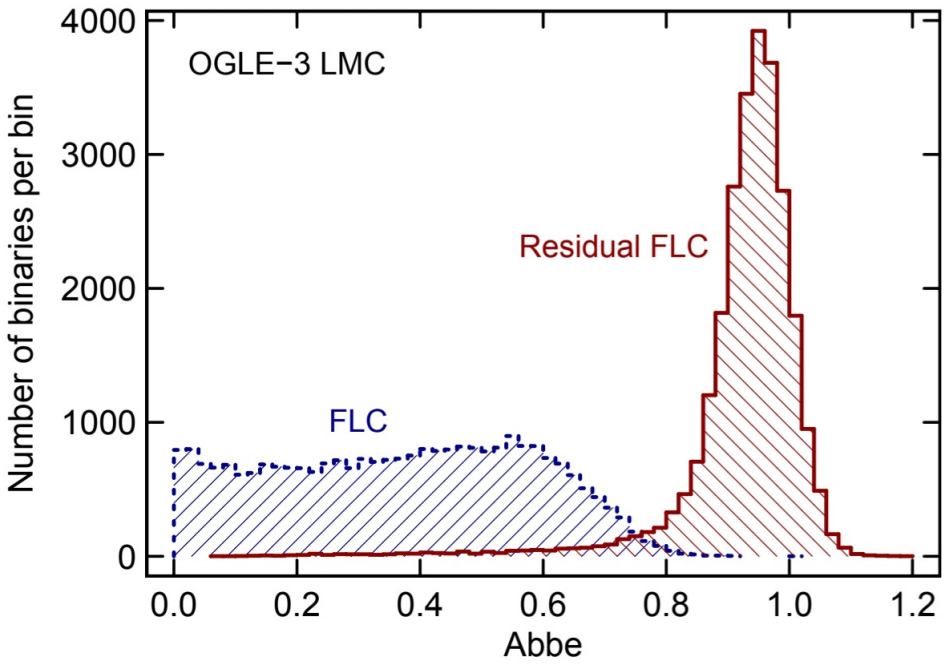


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Kształt

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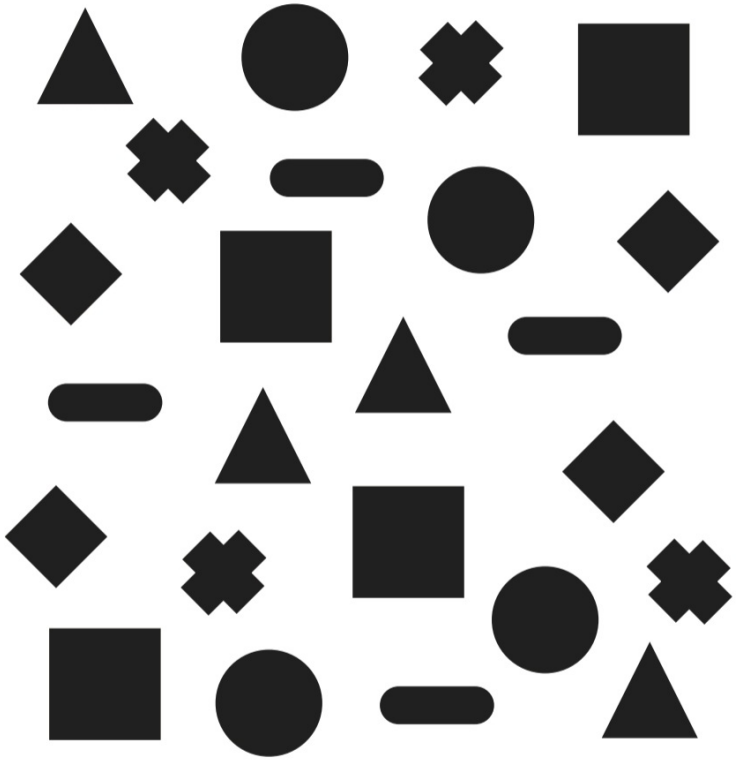


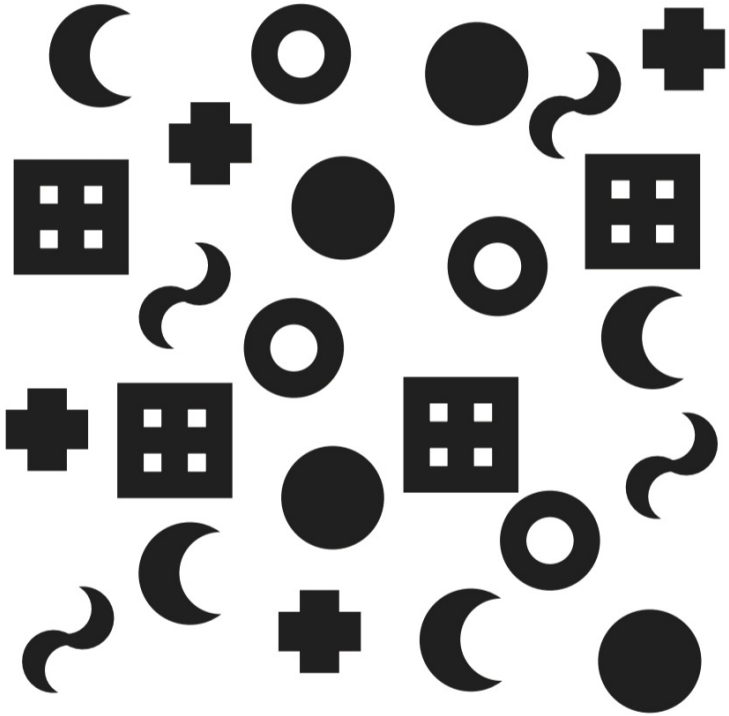


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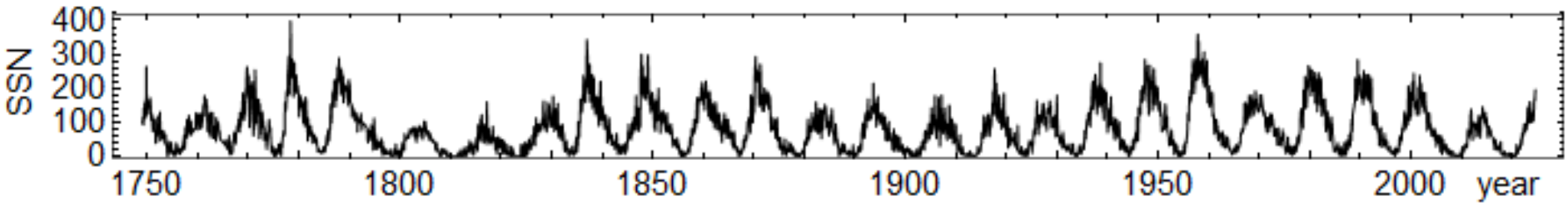


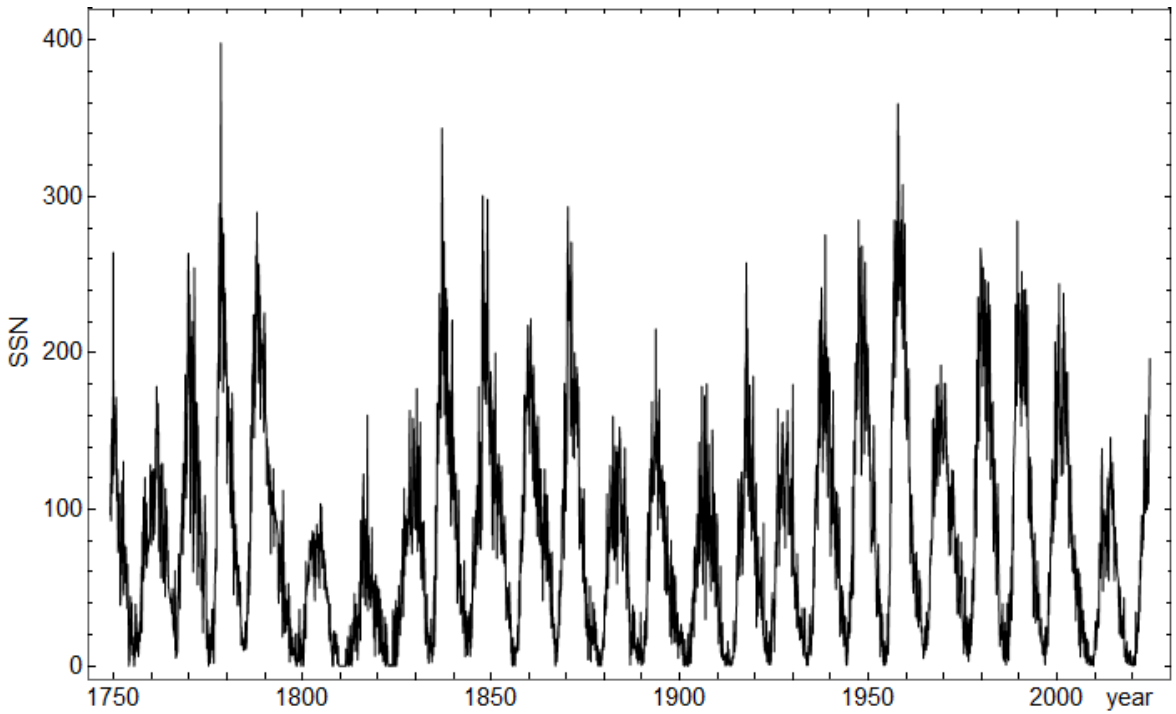


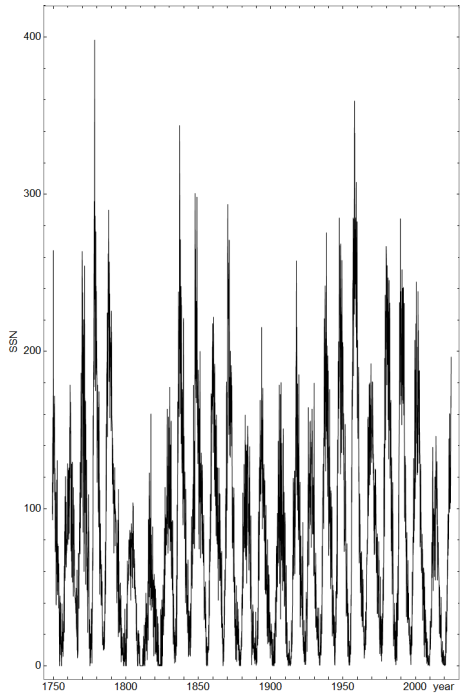
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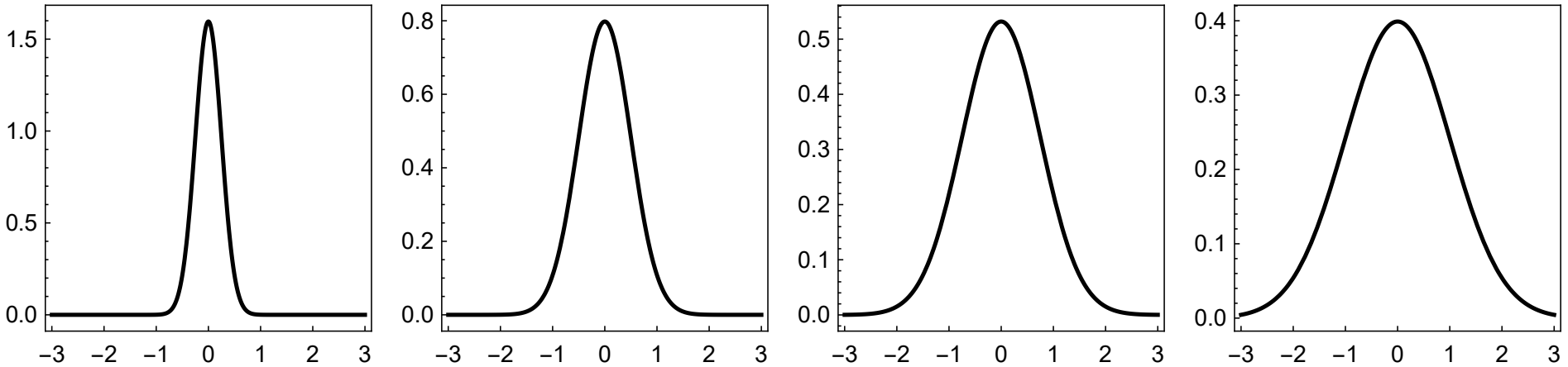
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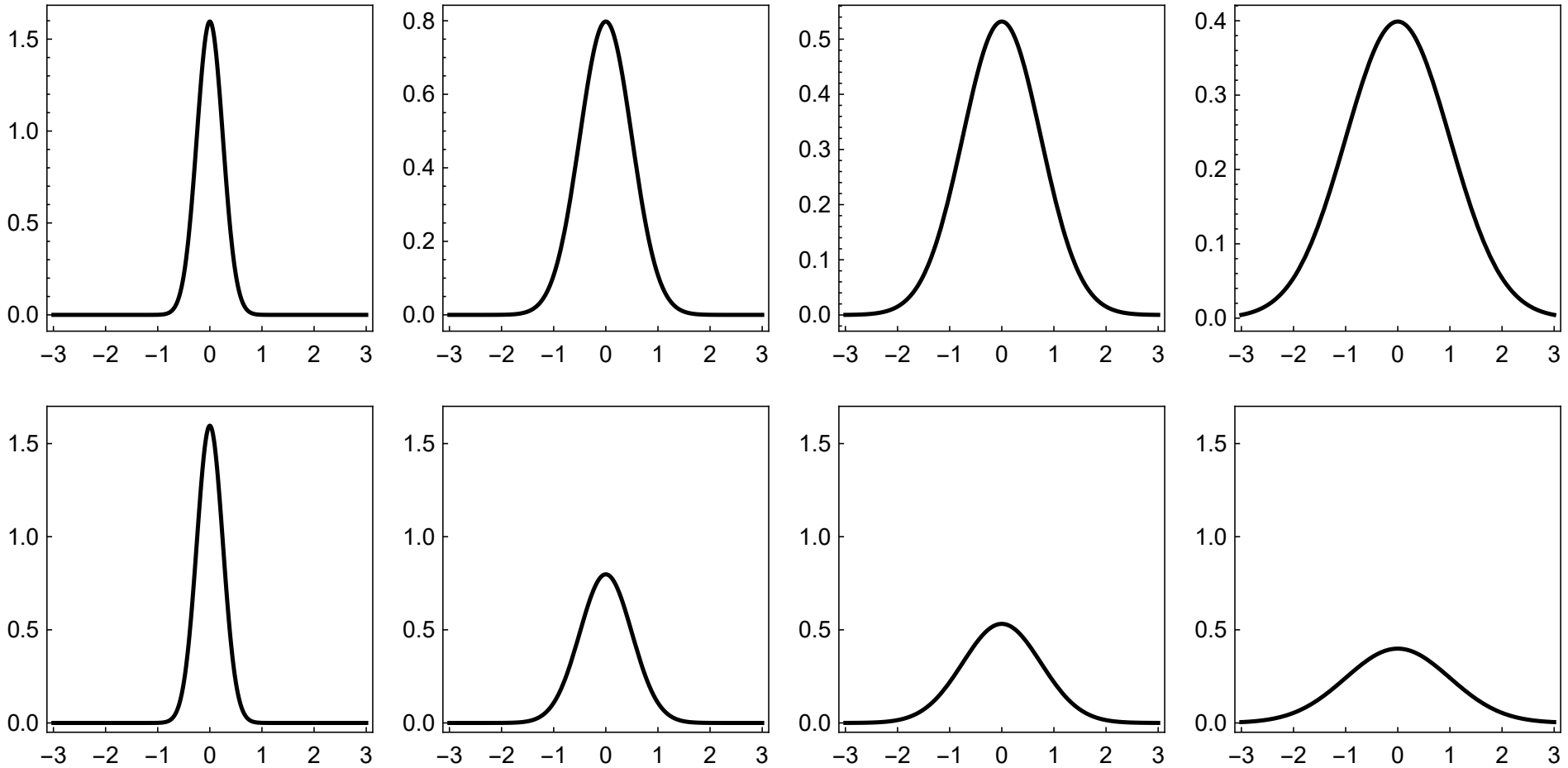




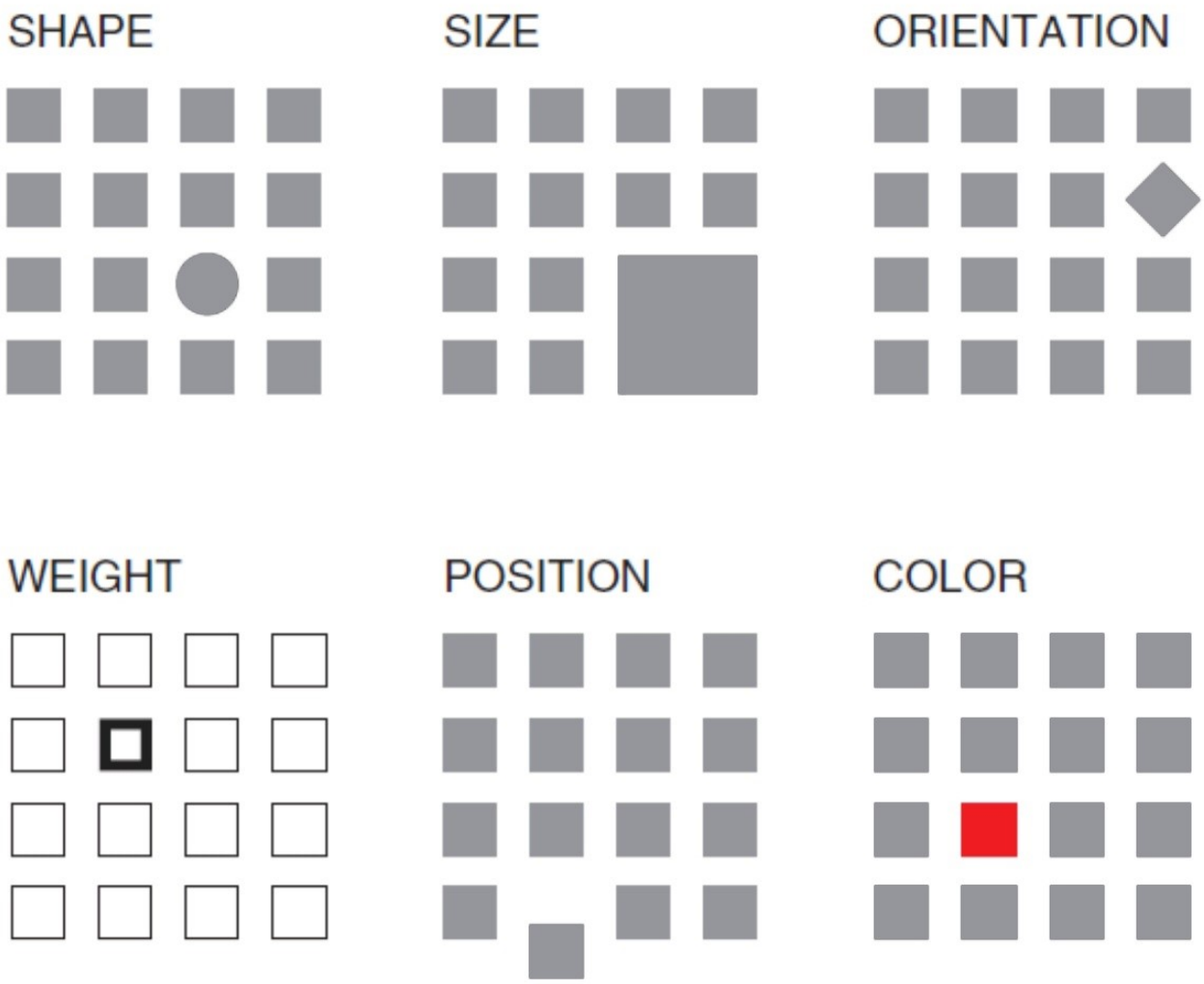
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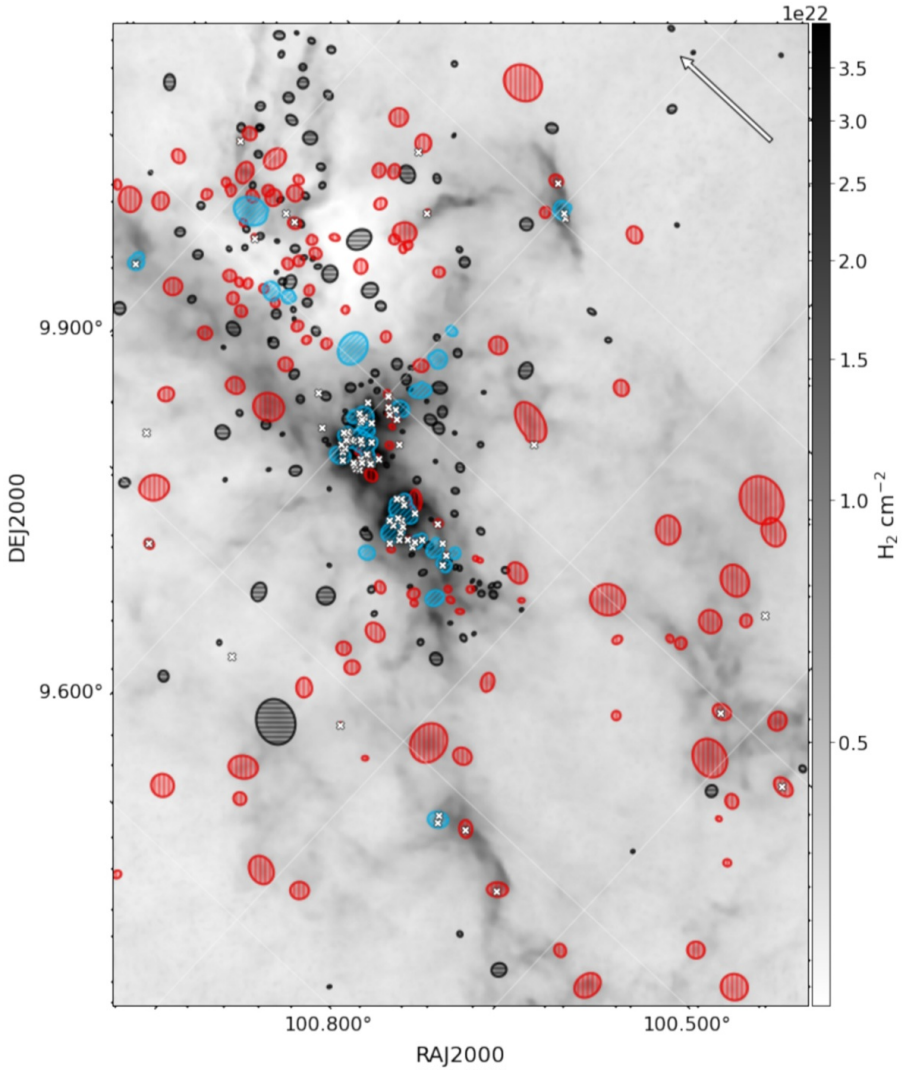
Przestrzeń



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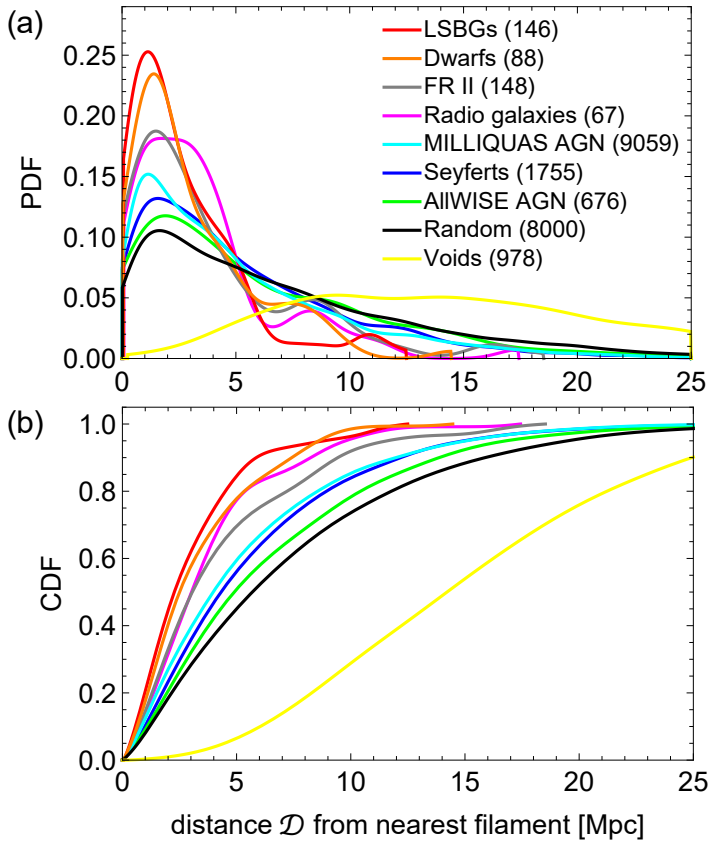


Kontrast



https://doi.org/10.1051/0004-6361/202243275

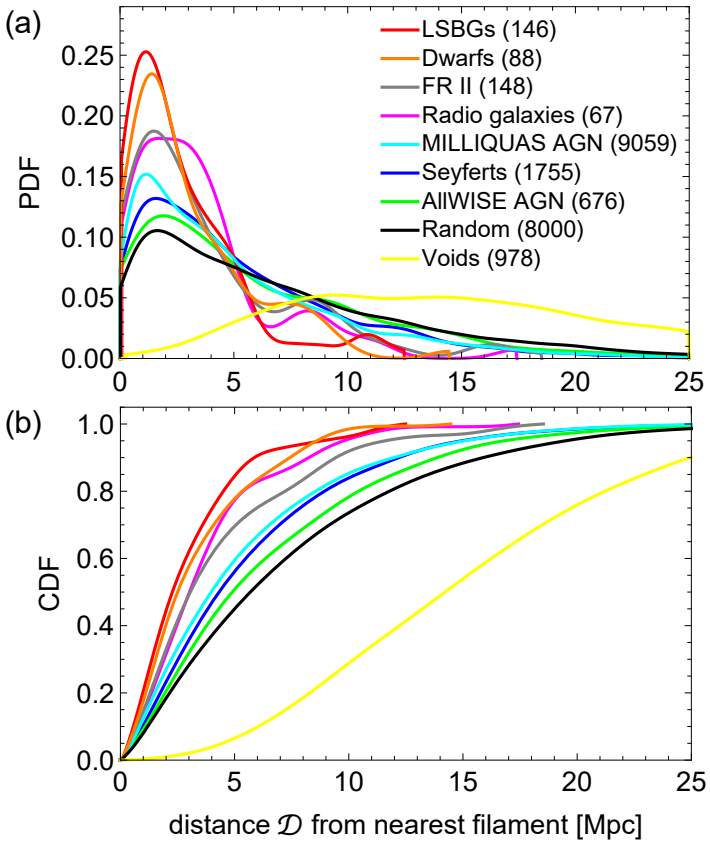
Powtórzenie

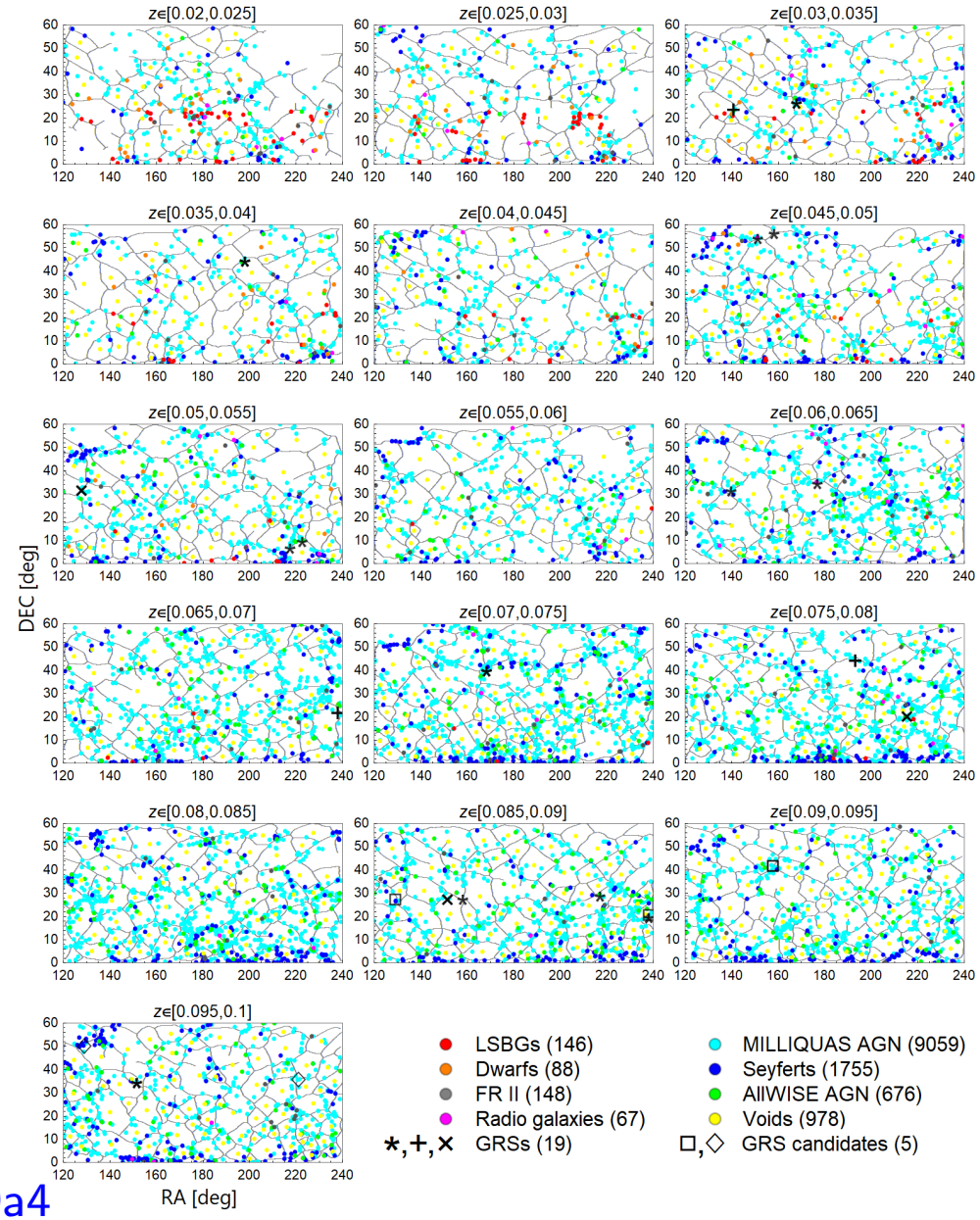


⋮

https://doi.org/10.3847/1538-4357/acd9a4

Powtórzenie





https://doi.org/10.3847/1538-4357/acd9a4

Powtórzenie

Table 1. Parameters of the fits to the *Fermi* data. Label corresponds to labels from Fig. 2. The smallest AIC is marked in bold, and p is the number of parameters in a model.

Label	Dist.	i	μ_i	σ_i	α_i	δ_i	β_i	A_i	$\mathcal{L}_{\max}$	AIC	ΔAIC	Pr	p
(a)	2-G	1	−0.073	0.525	–	–	–	0.215	−1711.342	3432.683	4.459	0.108	5
		2	1.451	0.463	–	–	–	0.785					
(b)	3-G	1	−0.409	0.379	–	–	–	0.107	−1707.672	3431.343	3.119	0.210	8
		2	0.668	0.570	–	–	–	0.231					
		3	1.530	0.426	–	–	–	0.662					
(c)	2-SN	1	−0.735	0.954	2.819	–	–	0.208	−1707.112	**3428.224**	0	1	7
		2	1.865	0.664	−1.507	–	–	0.792					
(d)	3-SN	1	−0.415	0.379	0.019	–	–	0.107	−1707.672	3437.343	9.119	0.010	11
		2	0.726	0.573	−0.127	–	–	0.231					
		3	1.515	0.426	0.044	–	–	0.662					
(e)	2-SAS	1	1.537	0.468	–	−0.014	1.068	0.685	−1706.089	3430.177	1.953	0.377	9
		2	2.158	6.146	–	−2.367	7.756	0.315					
(f)	3-SAS	1	0.434	1.063	–	0.370	2.111	0.214	−1704.248	3436.497	8.273	0.016	14
		2	0.473	0.402	–	−4.161	2.680	0.111					
		3	1.529	0.468	–	0.020	1.087	0.675					
(g)	1-ASN	1	0.744	0.590	−1.712	–	–	1	−1725.038	3456.077	27.853	$<10^{-6}$	3
(h)	2-ASN	1	0.087	0.499	0.535	–	–	0.186	−1710.427	3434.853	6.629	0.036	7
		2	1.150	0.483	−0.667	–	–	0.814					

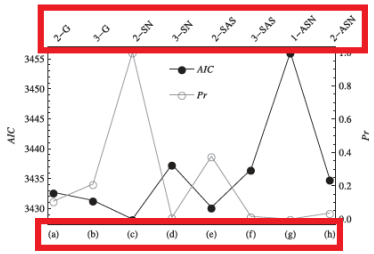


Figure 3. AIC and relative probability (Pr) for the *Fermi* models.

3.2.2 *BATSE and Swift*

The results are slightly different for the BATSE and *Swift* data sets, and are displayed in graphical form in Figs 4 and 5. Here, instead of fitting a 1-ASN and a 2-ASN, a 2-ASN and a 3-ASN distributions are fitted, because the 1-ASN yielded an AIC so large that a comparison with other models would be uninsightful.[7] For both samples, the minimal AIC is obtained for a mixture of three standard Gaussians, hence the results of all the previous analyses are confirmed (Horváth 2002; Horváth et al. 2008; Zhang & Choi 2008; Horváth 2009; Huja & Řípa 2009; Huja et al. 2009; Zitouni et al. 2015). However, for the second best models (2-SAS and 2-SN for BATSE and *Swift*, respectively), the ΔAIC is ≈1, corresponding to a relative probability of 57.9 per cent and 63.2 per cent for BATSE and *Swift*, respectively (see Tables 2 and 3). This is a substantial

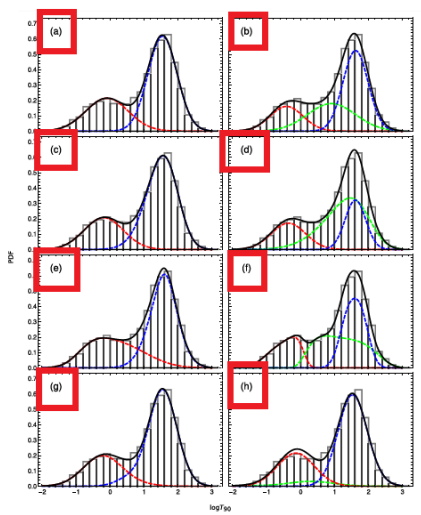
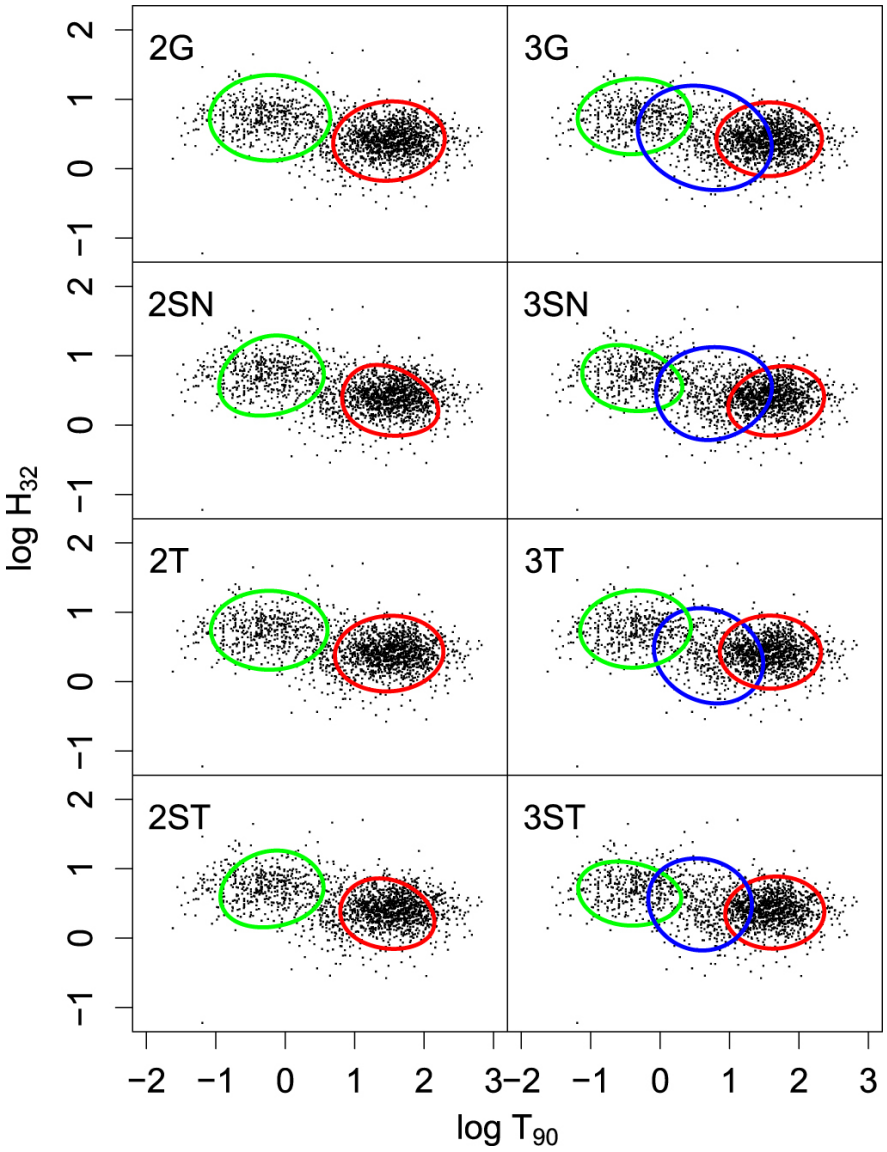
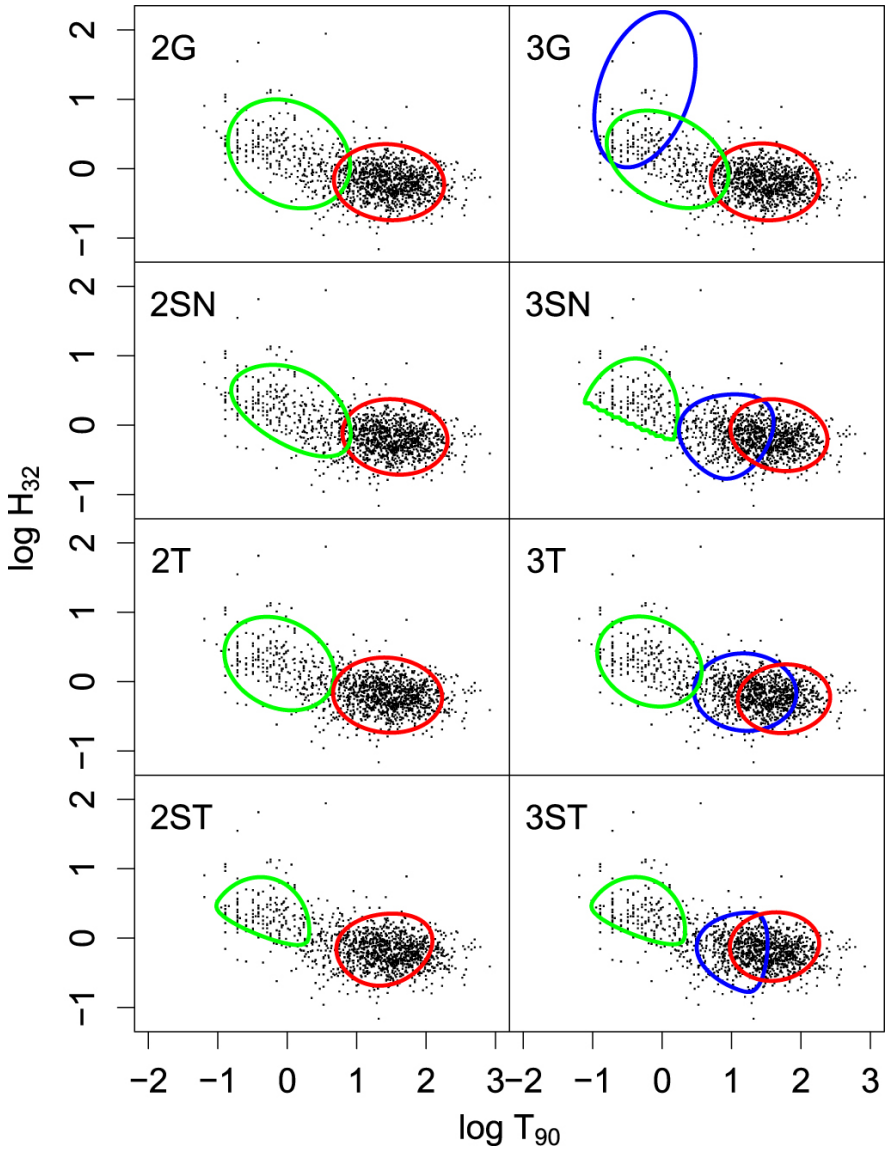


Figure 4. Distributions fitted to $\log T_{90}$ data from the BATSE current catalogue. Colour dashed curves are the components of the (black solid) mixture distribution. The panels show a mixture of (a) two standard Gaussians, (b) three standard Gaussians, (c) 2-SN, (d) 3-SN, (e) 2-SAS, (f) 3-SAS, (g) 2-ASN, and (h) 3-ASN distributions.

https://doi.org/10.3847/1538-4357/aaf1c5

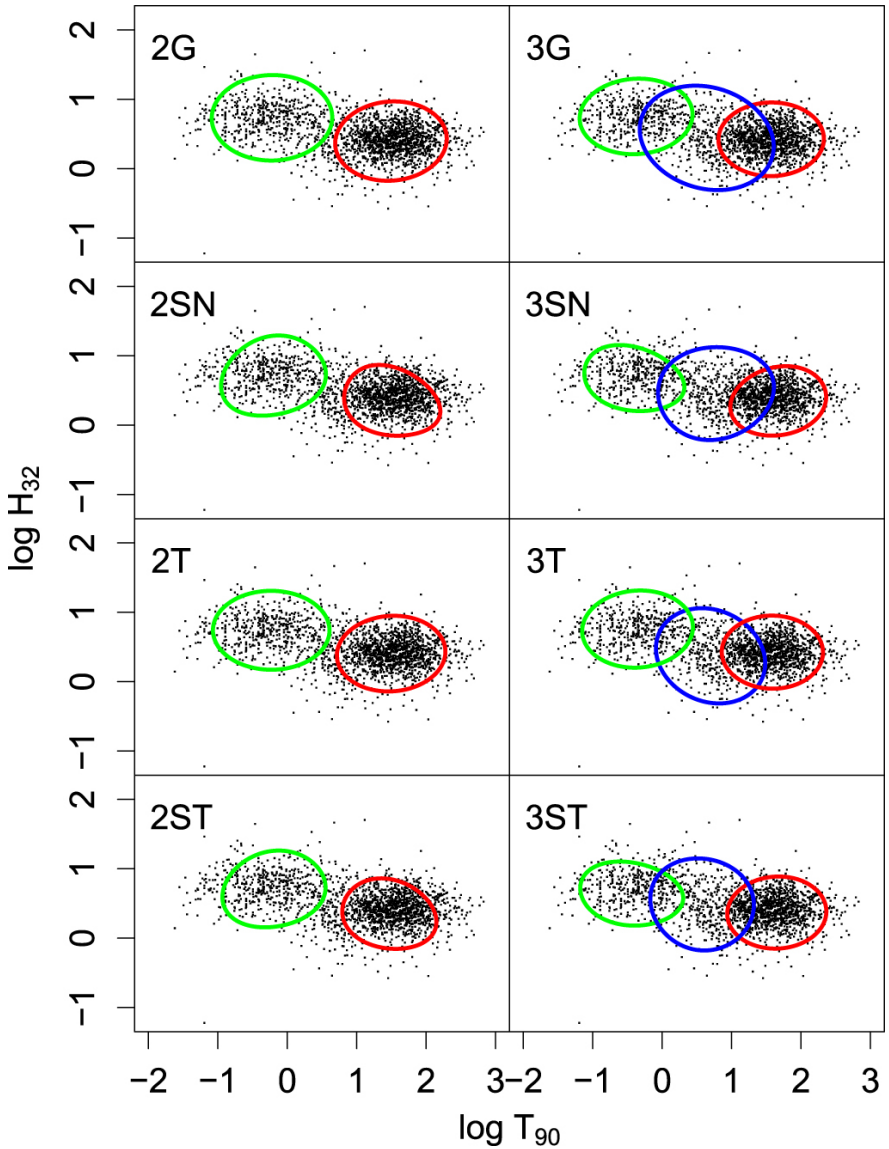
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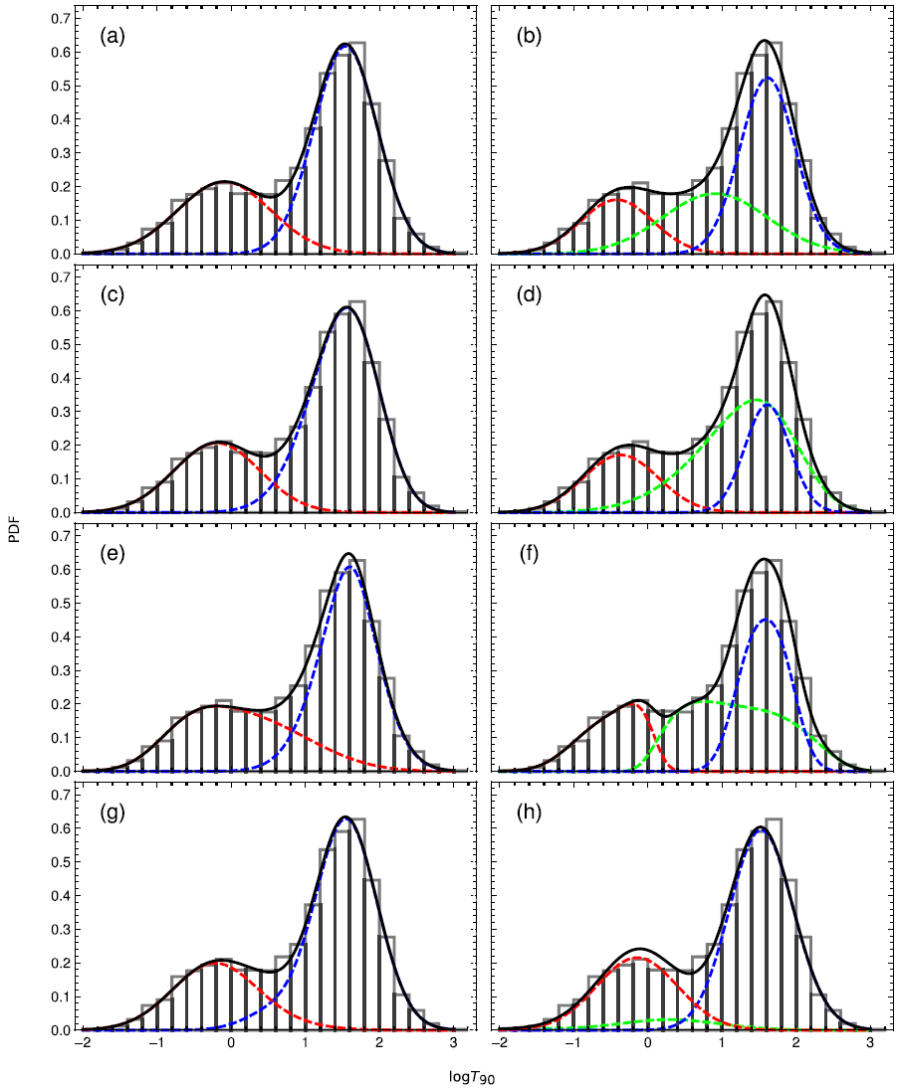




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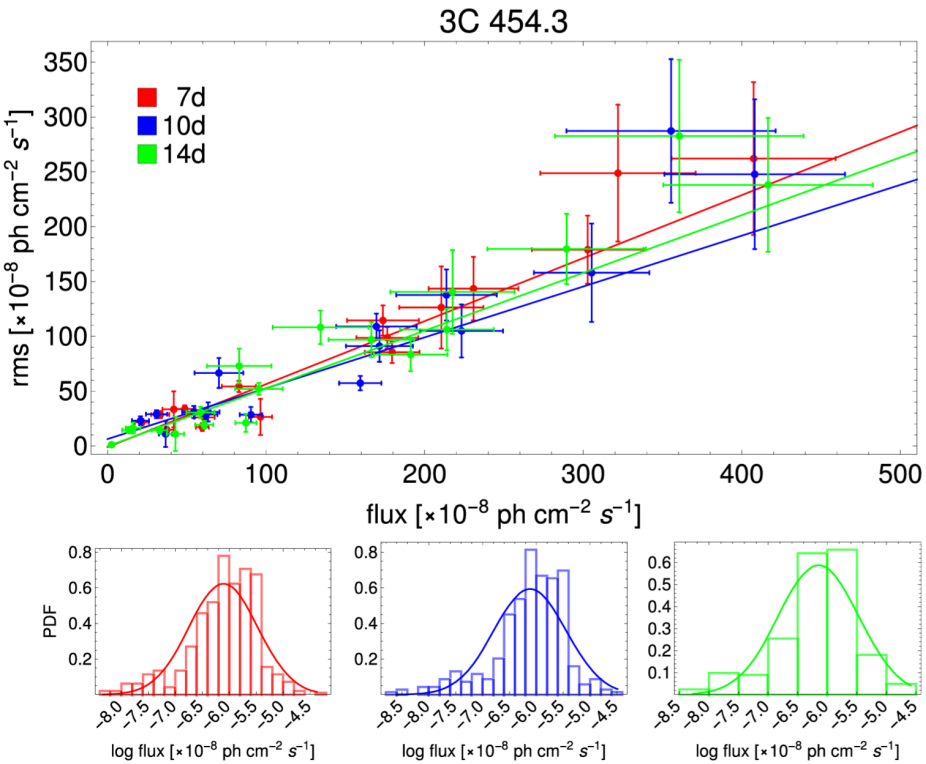
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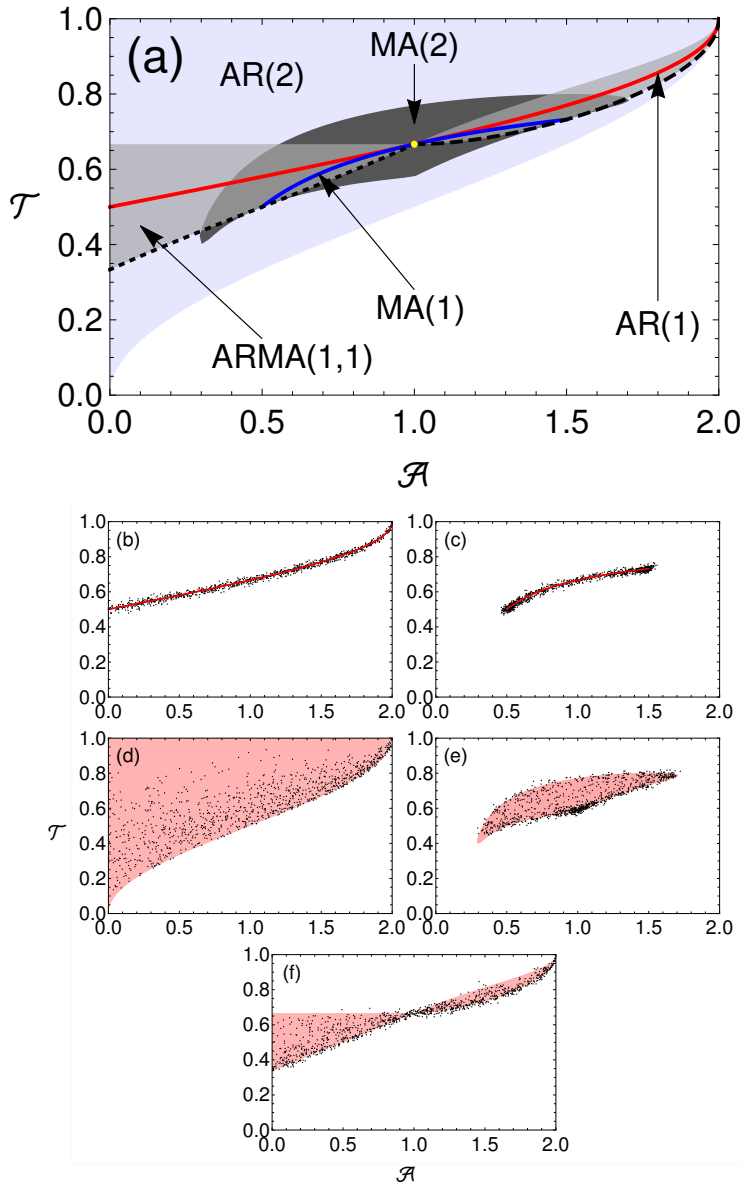




https://doi.org/10.3847/1538-4357/aaf1c5; https://doi.org/10.1093/mnras/stw429

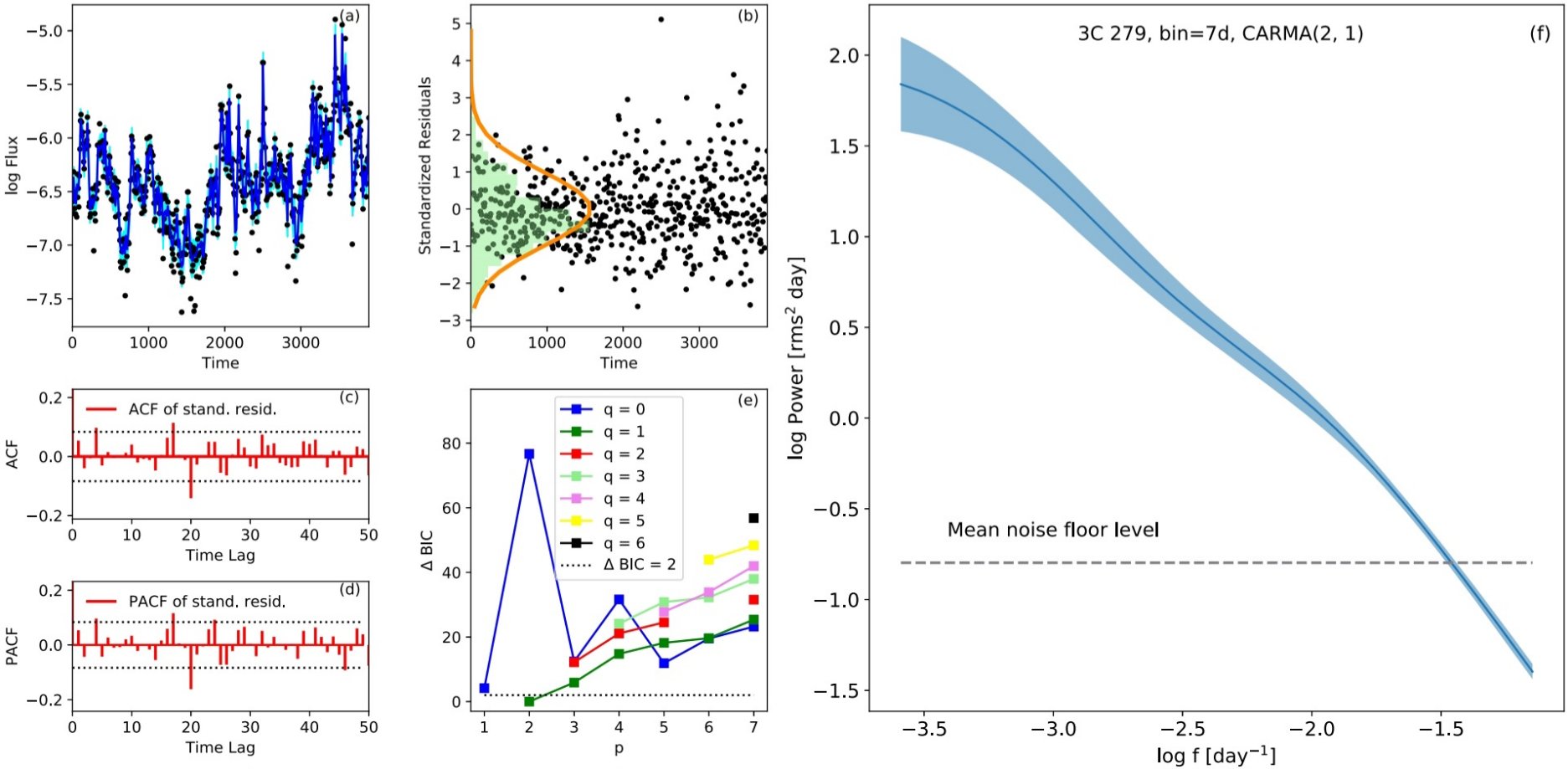
Skala





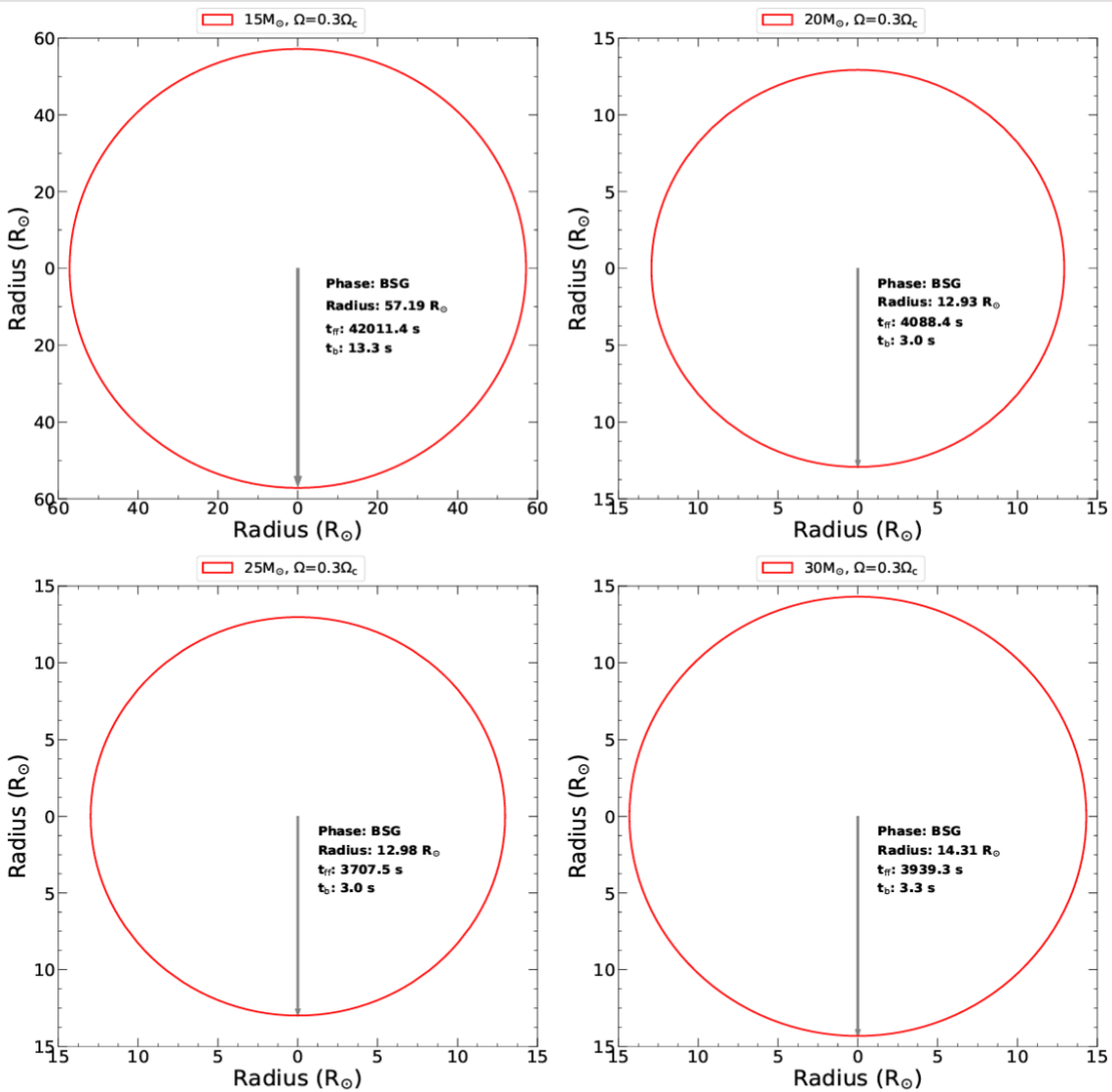
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Skala



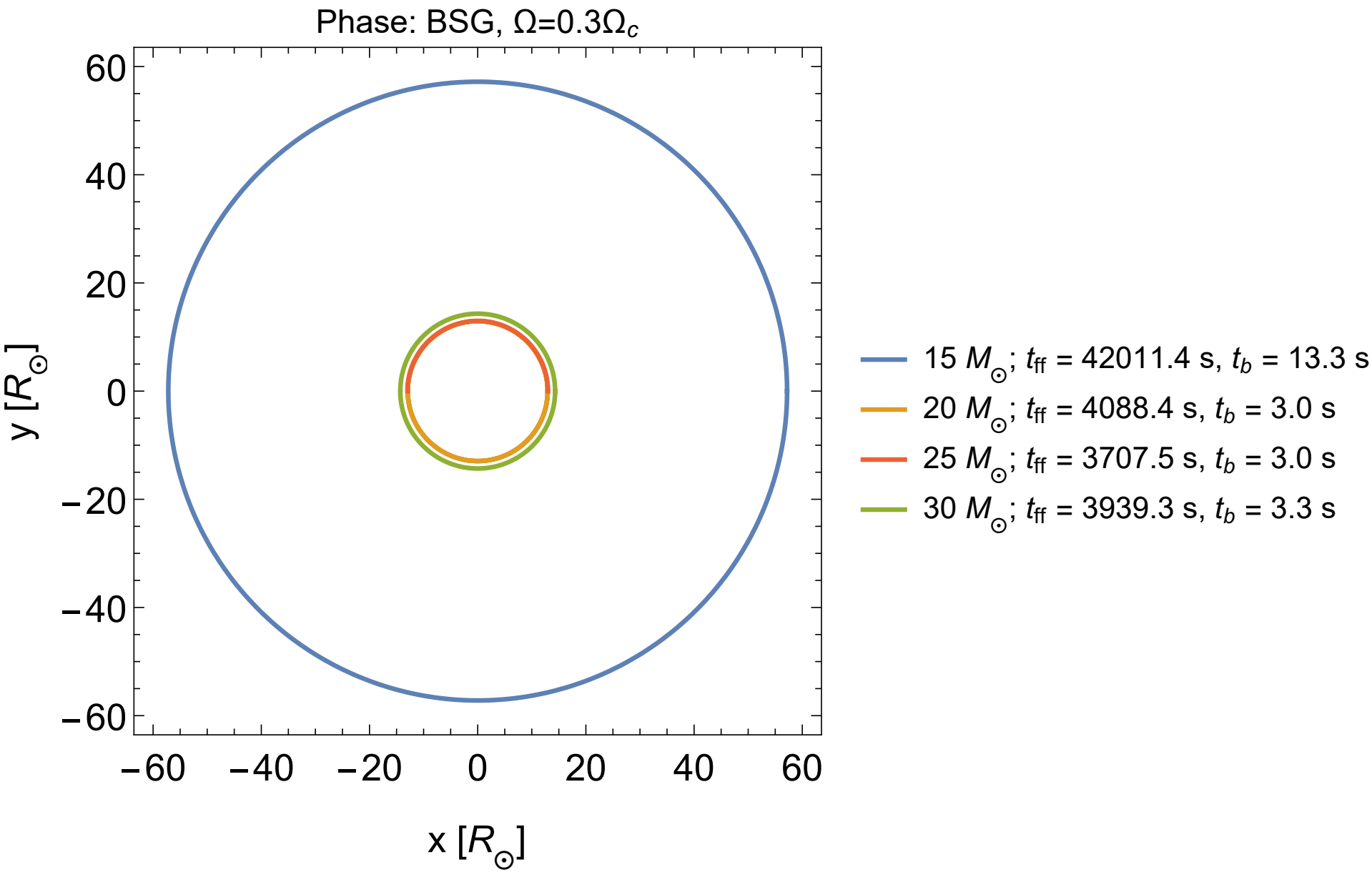
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Skala X

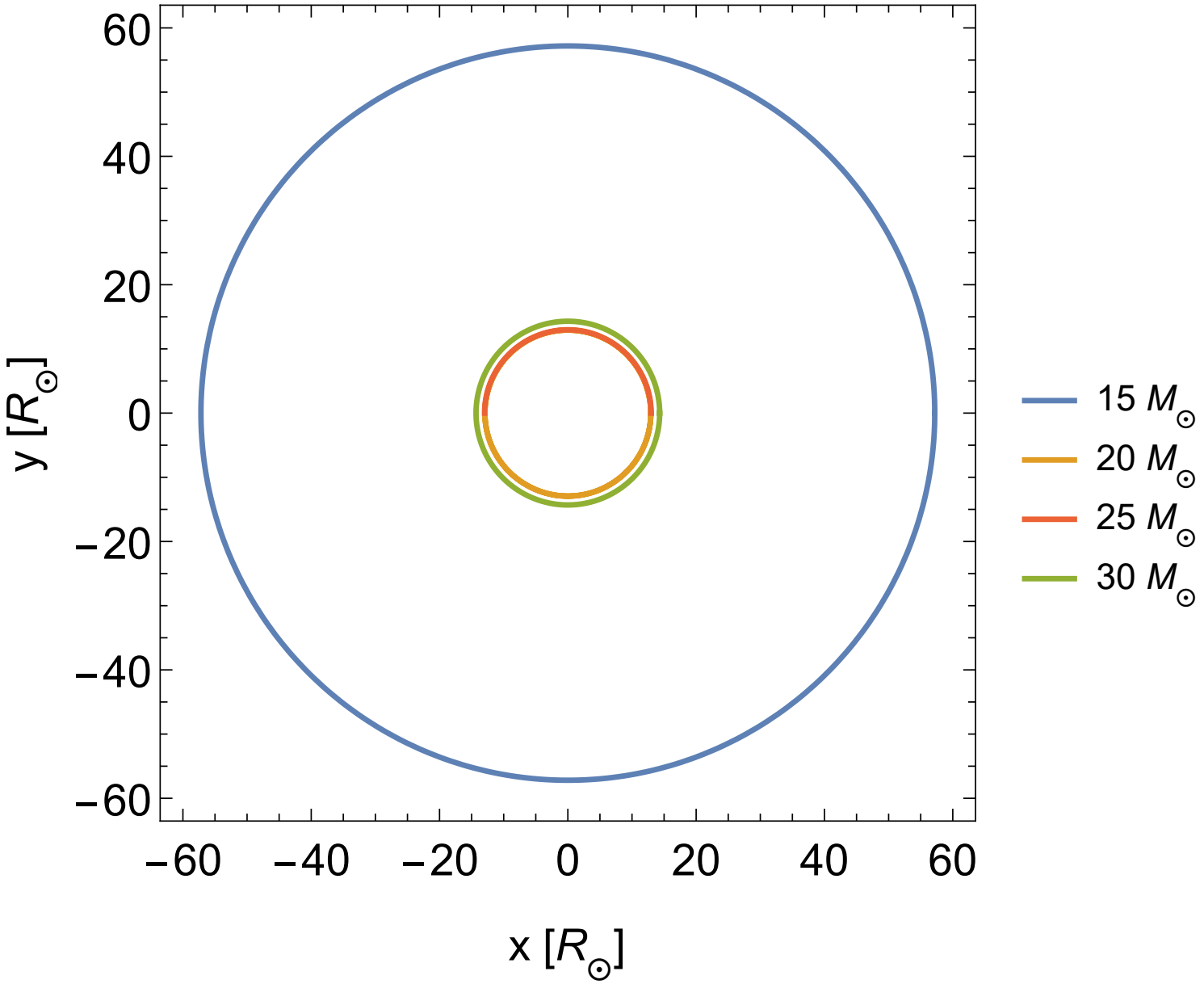


https://doi.org/10.3847/1538-4357/ad5554

Skala ✓


Phase: BSG, Ω=0.3Ω$_c$
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40
20
0
−20
−40
−60
y [$R_\odot$]
−60
−40
−20
0
20
40
60
x [$R_\odot$]
15 $M_\odot$; t_{ff} = 42011.4 s, t_b = 13.3 s
20 $M_\odot$; t_{ff} = 4088.4 s, t_b = 3.0 s
25 $M_\odot$; t_{ff} = 3707.5 s, t_b = 3.0 s
30 $M_\odot$; t_{ff} = 3939.3 s, t_b = 3.3 s

Skala ✓✓


60
40
20
0
−20
−40
−60
y [$R_\odot$]
−60
−40
−20
0
20
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60
x [$R_\odot$]
15 $M_\odot$
20 $M_\odot$
25 $M_\odot$
30 $M_\odot$

Hierarchia

Hierarchia ułatwia dostrzeżenie na wykresie tego co najistotniejsze. Tzn. elementy najważniejsze powinny najbardziej rzucać się w oczy.

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- Hierarchia typografii — np. wielkość czcionki w nagłówkach tekstu; wielkość etykiet na wykresie itp.
- Elementy graficzne — powiązanie z wyróżnieniem (slajd 6), kontrastem (slajd 25) i skalą (slajd 31), ale też balansem (slajd 4), kompozycją (slajd 16) i kształtem (slajd 19).

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