



Visualisasi Data dengan Python

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Pendahuluan



Cara Belajar Python dan Pustaka Matplotlib

Googling tutorial Python dan Matplotlib

Rekomendasi:

- <https://www.math.ubc.ca/~pwalls/math-python/>
- <https://github.com/venkatesannaveen/python-science-tutorial>

Praktik Langsung Kalkulasi, Visualisasi, dan Menulis Paper :-))

- <https://github.com/artnugraha/DiracTE>
- (pretty view:) <https://nbviewer.org/github/artnugraha/DiracTE>

Home > Journal of Applied Physics > Volume 126, Issue 3 > 10.1063/1.5100985

Full • Submitted: 22 April 2019 • Accepted: 22 June 2019 • Published Online: 19 July 2019

Optimal band gap for improved thermoelectric performance of two-dimensional Dirac materials

Journal of Applied Physics **126**, 035109 (2019); <https://doi.org/10.1063/1.5100985>

Eddwi H. Hasdeo^{1,a)}, Lukas P. A. Krisna², Muhammad Y. Hanna¹, Bobby E. Gunara², Nguyen T. Hung³, and Ahmad R. T. Nugraha^{1,4,b)}

more...



Contoh praktik langsung sampai jadi paper

<https://github.com/artnugraha/DiracTE>

artnugraha Add files via upload

31ede38 on 20 Aug 2019 9 commits

DiracTE-CRTA.ipynb	Add files via upload	3 years ago
DiracTE-parabolic.ipynb	Add files via upload	3 years ago
DiracTE.ipynb	Add files via upload	3 years ago
FitDiracParabolic.ipynb	Add files via upload	3 years ago
LICENSE	Initial commit	3 years ago
README.md	Update README.md	3 years ago

README.md

Notes, derivations, and codes for thermoelectrics of Dirac materials. If readers benefit from these notebooks, please cite our paper: **Optimal band gap for improved thermoelectric performance of two-dimensional Dirac materials**, which is published in [Journal of Applied Physics 126, 035109 \(2019\)](#).

There are several Jupyter (Python) notebooks related to the paper:

- [DiracTE.ipynb](#) for the main results of our paper. The calculations are performed within the energy-dependent relaxation time approximation.
- [DiracTE-CRTA.ipynb](#) for the results in Appendix. The calculations are performed within the constant relaxation time approximation.
- [DiracTE-parabolic.ipynb](#) for calculation of thermoelectrics of parabolic bands, compared with that of Dirac bands.
- [FitDiracParabolic.ipynb](#) to see if the results for Dirac bands can be fitted with parabolic bands.

For the best online rendering of the Python notebooks, please use nbviewer.jupyter.org and type this GitHub repository address: **artnugraha/DiracTE**

Notes, derivations, and codes for thermoelectrics of Dirac materials [J. Appl. Phys. 126, 035109 (2019)].

<https://doi.org/10.1063/1.5100985>

[Readme](#)

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3 stars

1 watching

0 forks

Releases

No releases published
[Create a new release](#)

Packages

No packages published
[Publish your first package](#)

Languages

• Jupyter Notebook 100.0%



Dampak Positif dari “Open Science”

Contoh dampak pada akhir 2022

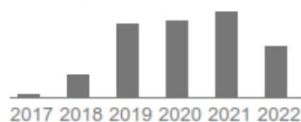
Two-dimensional InSe as a potential thermoelectric material

Authors Nguyen T Hung, Ahmad RT Nugraha, Riichiro Saito
Publication date 2017/9/1
Journal Applied Physics Letters
Volume 111
Issue 9
Pages 092107
Publisher AIP

APL Impact Factor:
3.791

Description Thermoelectric properties of monolayer indium selenide (InSe) are investigated by using Boltzmann transport theory and first-principles calculations as a function of Fermi energy and crystal orientation. We find that the maximum power factor of p-type (n-type) monolayer InSe can be as large as 0.049 (0.043) W/K²m at 300 K in the armchair direction. The excellent thermoelectric performance of monolayer InSe is attributed to both its Seebeck coefficient and electrical conductivity. The large Seebeck coefficient originates from the moderate (about 2 eV) bandgap of monolayer InSe as an indirect gap semiconductor, while its large electrical conductivity is due to its unique two-dimensional density of states (DOS), which consists of an almost constant DOS near the conduction band bottom and a sharp peak near the valence band top.

Total citations Cited by 98



98 citations in 5 years:
“impact factor”
 $98/(5/2) = 39.2$

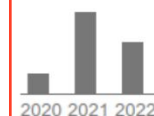
Optimal band gap for improved thermoelectric performance of two-dimensional Dirac materials

Authors Eddwi H Hasdeo, Lukas PA Krisna, Muhammad Y Hanna, Bobby E Gunara, Nguyen T Hung, Ahmad RT Nugraha
Publication date 2019/7/19
Journal Journal of Applied Physics
Volume 126
Pages 035109
Publisher AIP Publishing

JAP Impact Factor:
2.546

Description Thermoelectric properties of two-dimensional (2D) Dirac materials are calculated within linearized Boltzmann transport theory and relaxation time approximation. We find that the gapless 2D Dirac material exhibits poorer thermoelectric performance than the gapped one. This fact arises due to the cancelation effect from electron-hole contributions to the transport quantities. Opening the bandgap lifts this cancelation effect. Furthermore, there exists an optimal bandgap for maximizing figure of merit (ZT) in the gapped 2D Dirac material. The optimal bandgap ranges from 6 k_BT to 18 k_BT, where k_B is the Boltzmann constant and T is the operating temperature in kelvin. This result indicates the importance of having narrow gaps to achieve the best thermoelectrics in 2D systems. Larger maximum ZT s can also be obtained by suppressing the lattice thermal conductivity. In the most ideal case where the lattice thermal ...

Total citations Cited by 15



15 citations in 3 years:
“impact factor”
 $15/(3/2) = 10$

Peneliti lain bisa jadi merujuk kita hanya gara-gara keberadaan kode terbuka



Serba-Serbi Pembuatan Grafik untuk Artikel Ilmiah



Pentingnya tampilan yang menarik

“A picture speaks a thousand words”



(Gambar dari Nature's delight)

Es krim yang penuh dengan krim, enak, yummy, lembut. Mengandung coklat chip disertai mint yang yummy. Warna-warni es dari bahan alami, menenangkan pikiran, mendinginkan kepala. Topping yang bervariasi membuat rasanya sangat nikmat, dst...



Namun hati-hati...

*“A **picture** speaks a thousand words.
However, with illustration software,
the picture may tell a **thousand lies**.”*

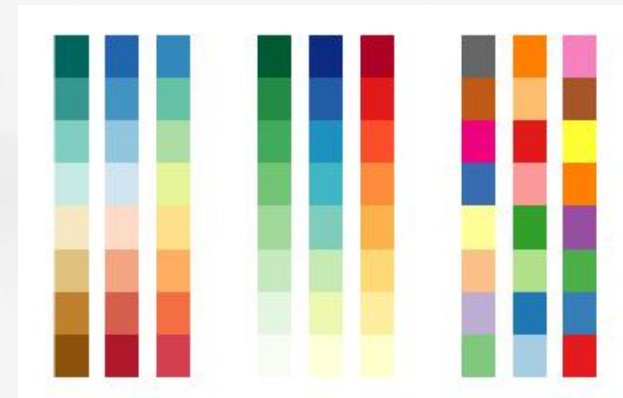
Penggunaan perangkat lunak pengolah gambar secara berlebihan dapat mengaburkan makna data ilmiah dari gambar tersebut



Standar grafik/ilustrasi ilmiah

Standar Umum

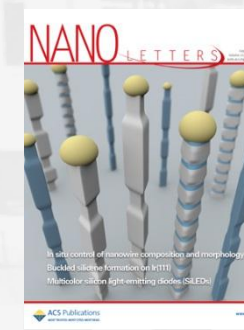
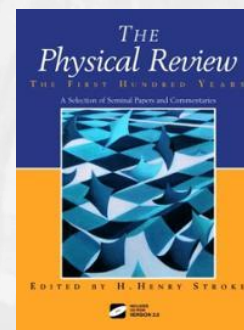
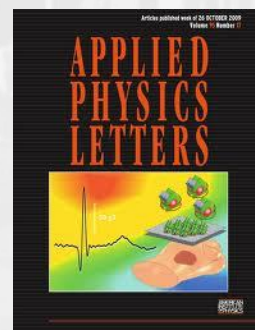
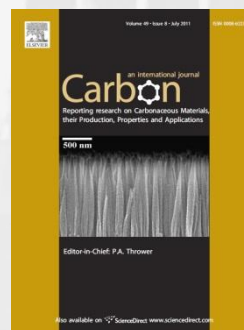
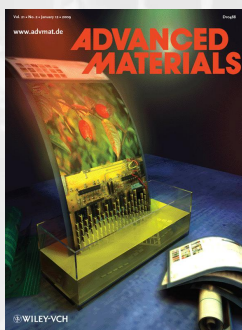
- Palet warna yang seragam
- Label sumbu cukup besar agar terbaca
- Ukuran dan jenis huruf yang konsisten
- Jangan lupa mencantumkan SATUAN!
- ...



Serif **vs** Sans-Serif

Standar Khusus

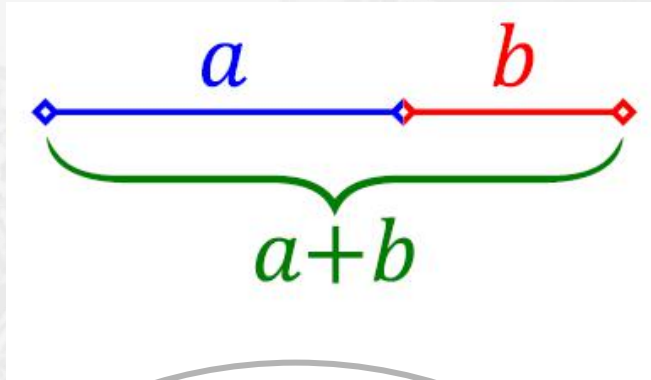
- Tipe artikel: paper ilmiah atau artikel populer atau lainnya
- Setiap jurnal memiliki spesifikasi masing-masing



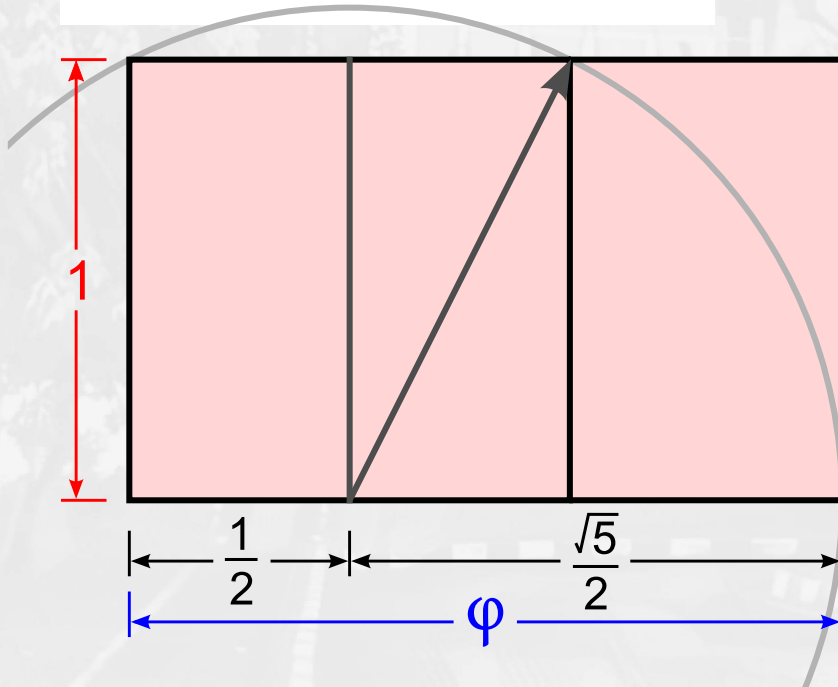


Golden ratio (kalau mau pakai...)

Berikan proporsi yang baik untuk setiap ilustrasi

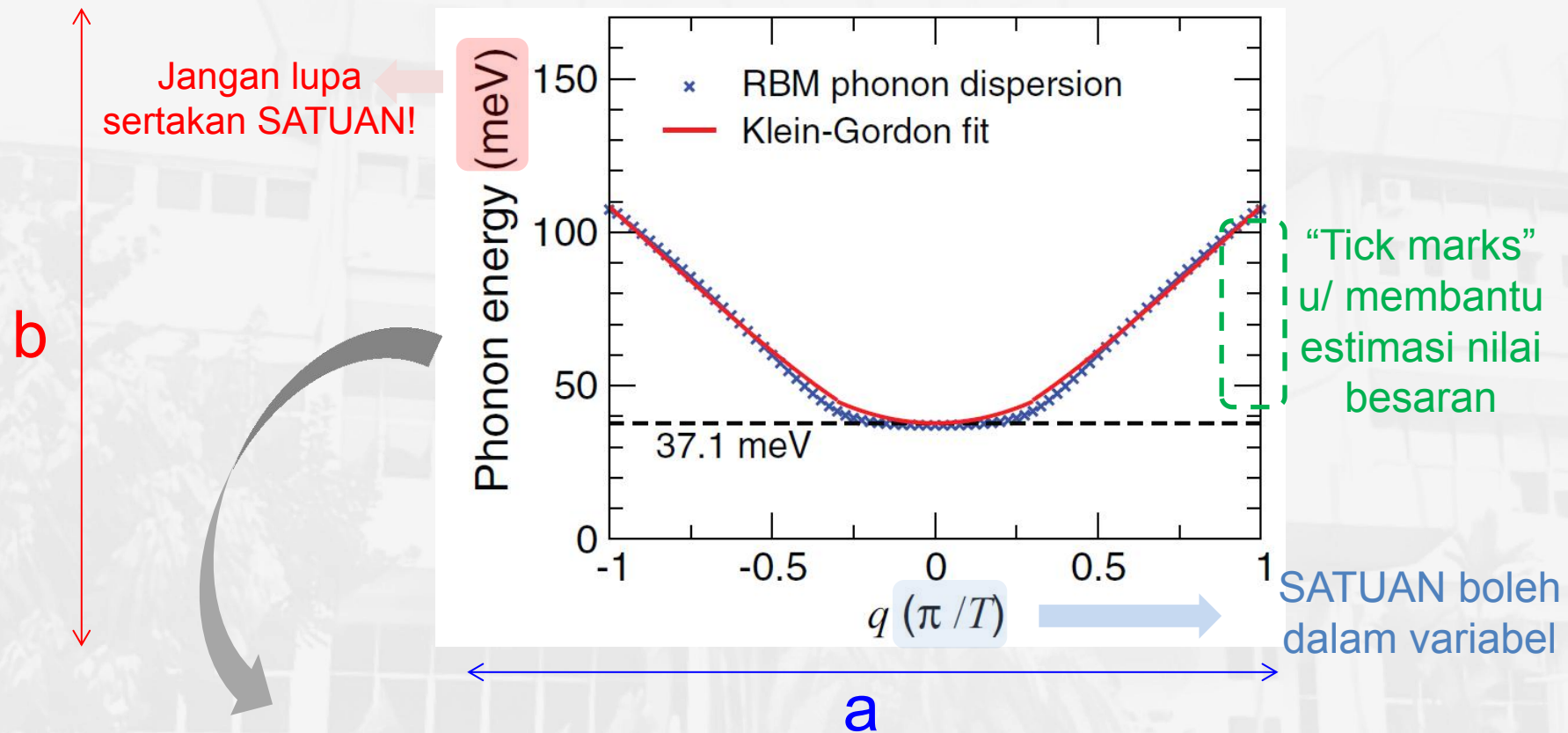


$$\varphi = \frac{a}{b} = \frac{a+b}{a} \approx 1.618...$$





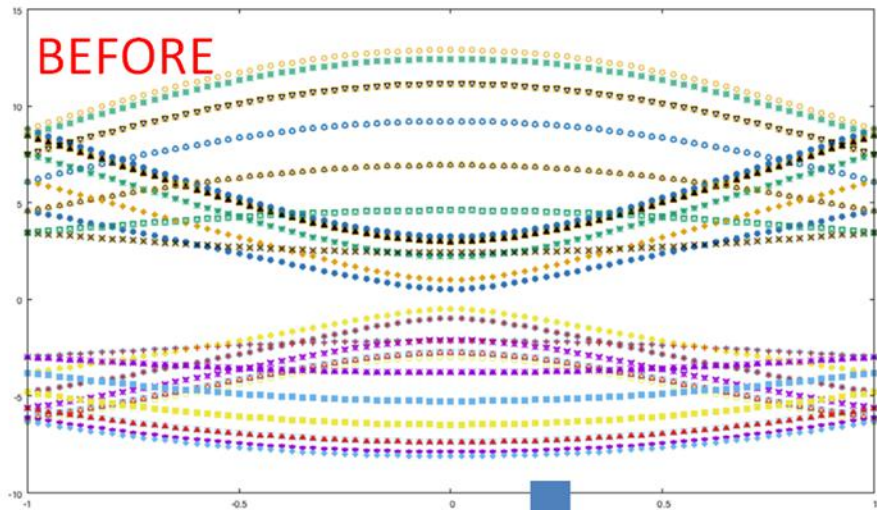
Golden ratio (kalau mau pakai...)



Gunakan huruf yang konsisten dengan ukuran yang jelas terbaca
Upayakan a/b sedekat mungkin dengan golden ratio
Hindari informasi redundan pada legenda
Format upayakan Vector (EPS, PDF)

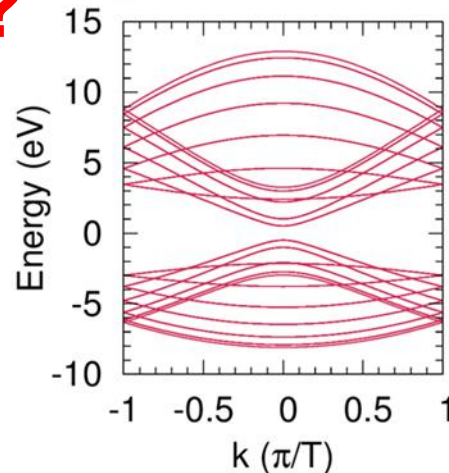


Contoh perbaikan grafik sederhana



AFTER polished ?

- Label sumbu lebih terbaca
- Besaran dengan satuan dicantumkan
- "Tick marks" jelas
- Pilihan warna tidak aneh-aneh



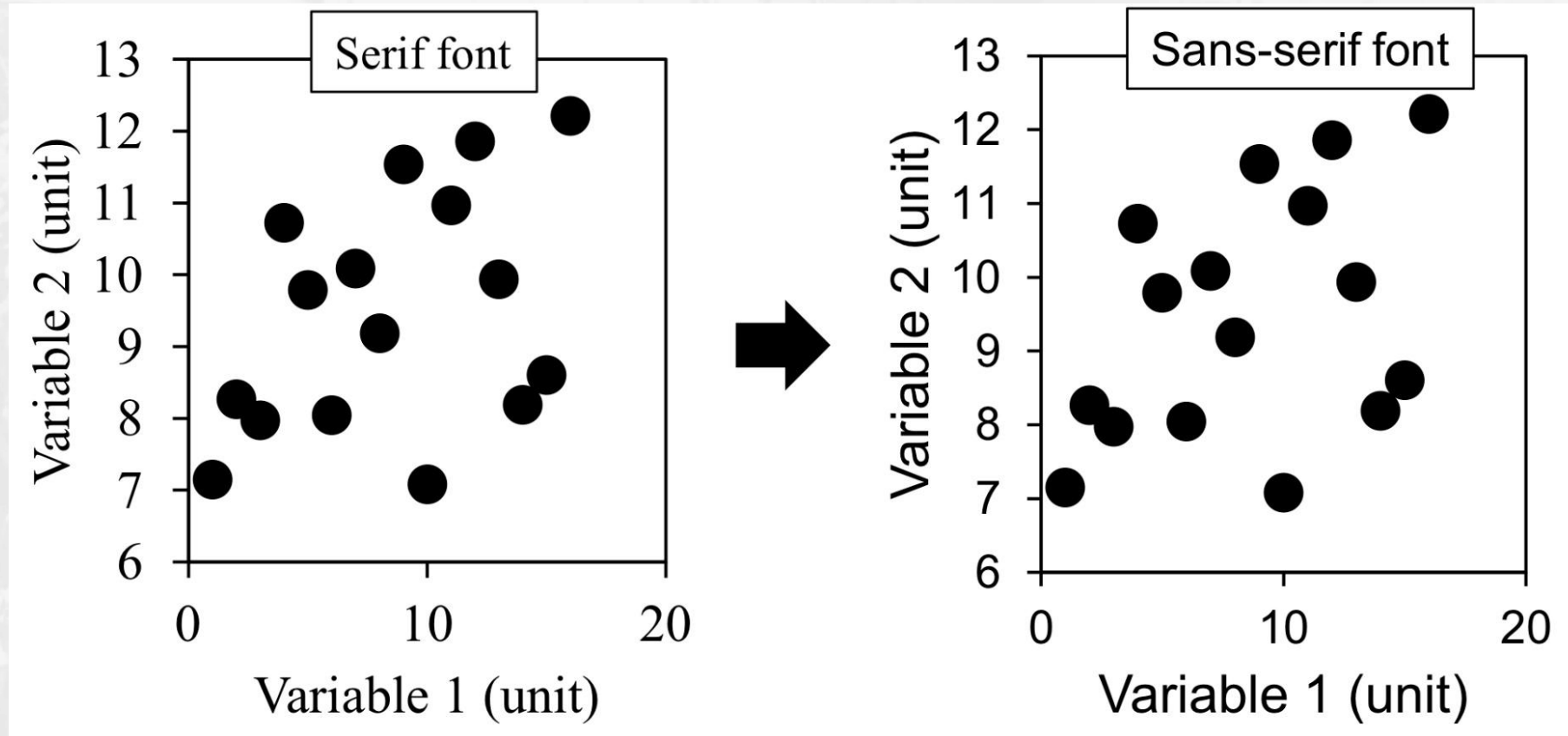
Seorang mahasiswa menggambar pita energi *carbon nanotube* sebagai fungsi k atau *wavevector* dari elektron. Hasilnya seperti pada gambar terlihat “wah”, tetapi tidak memberikan informasi apapun.

Pada dasarnya kita tidak perlu memberi warna-warni yang berlebihan pada setiap garis yang tidak memiliki “makna khusus” atau “nilai kepentingan” tertentu.



Pilihan huruf

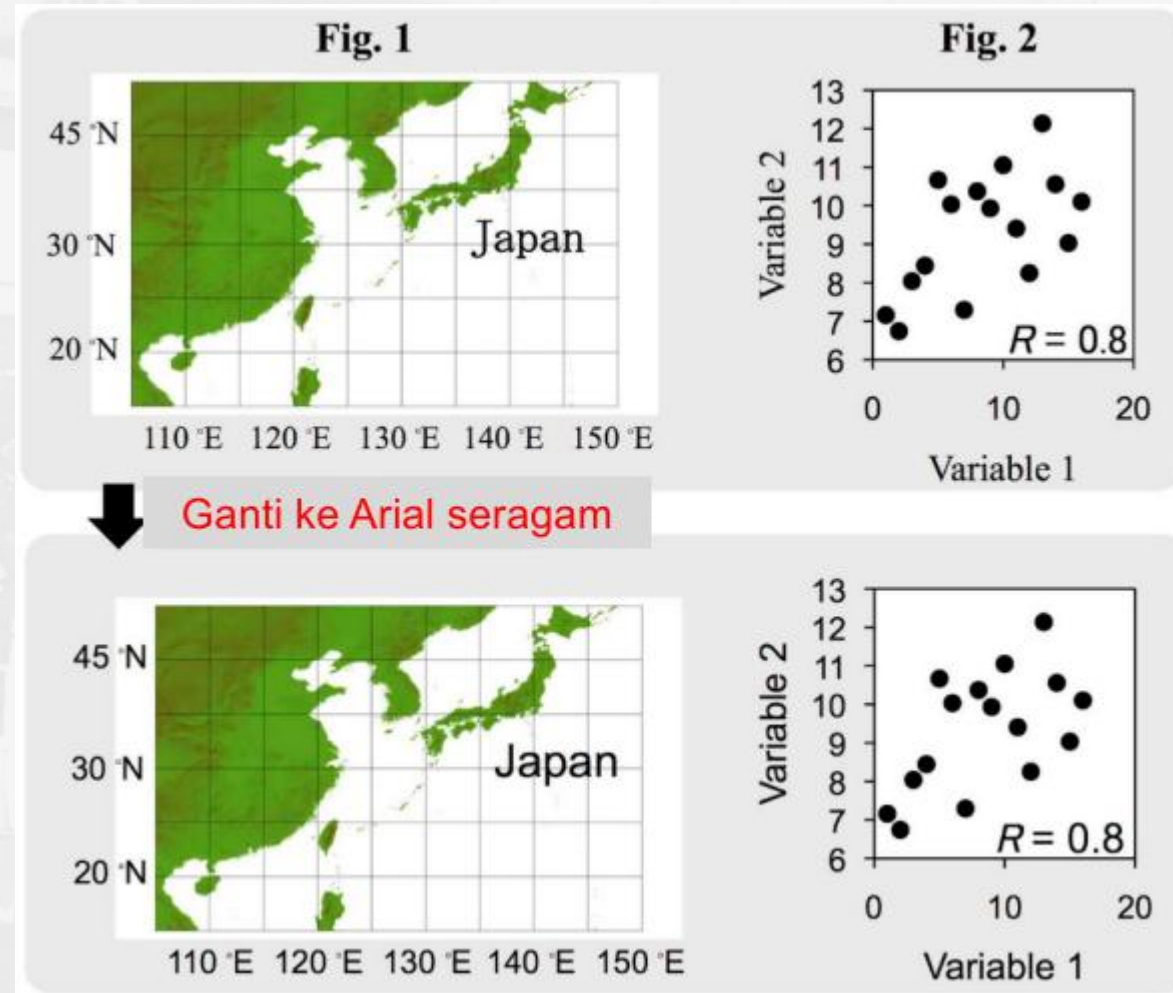
Gunakan font Sans-serif (Helvetica atau Arial biasanya lebih disukai).





Pilihan huruf

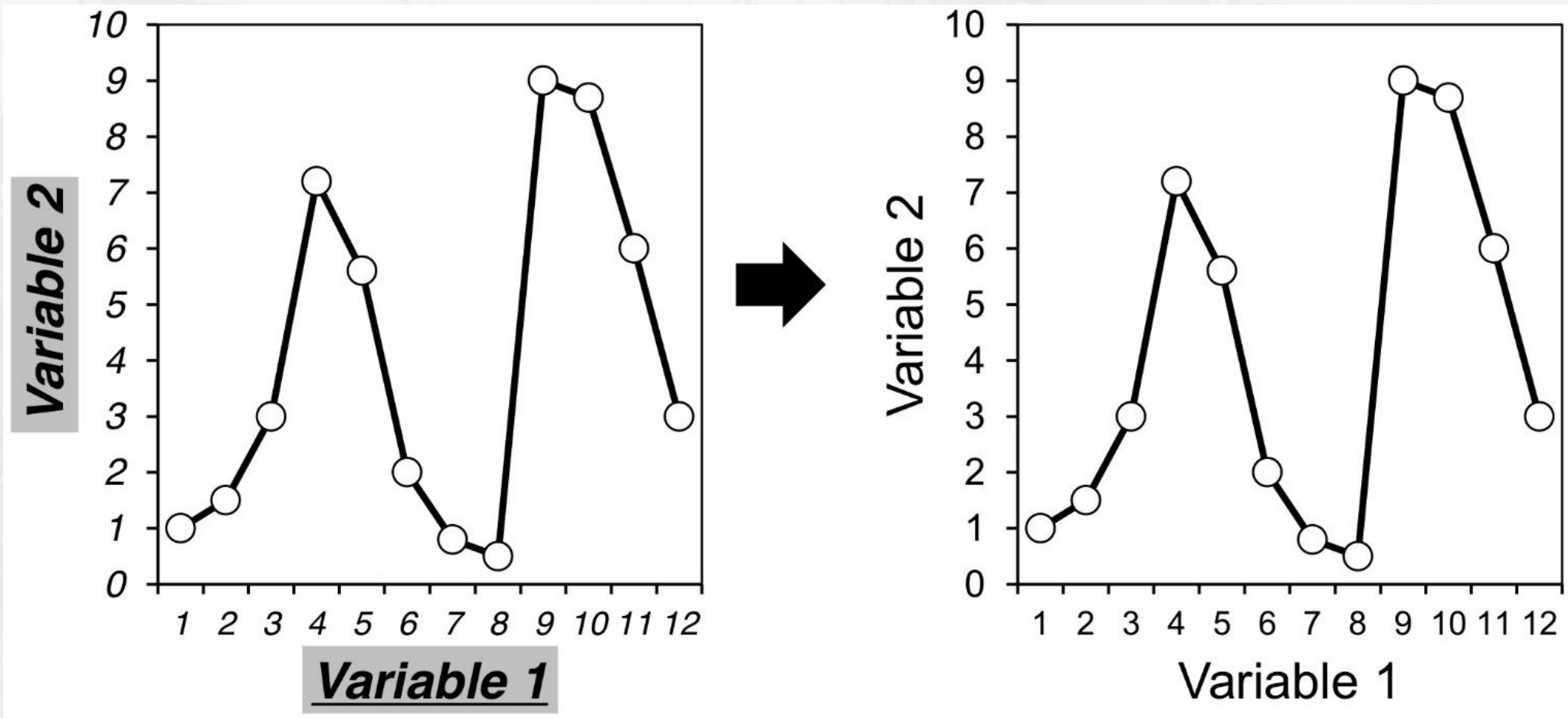
Sebisa mungkin seragamkan jenis huruf, kecuali jika dibutuhkan untuk rumus matematis





Pilihan huruf

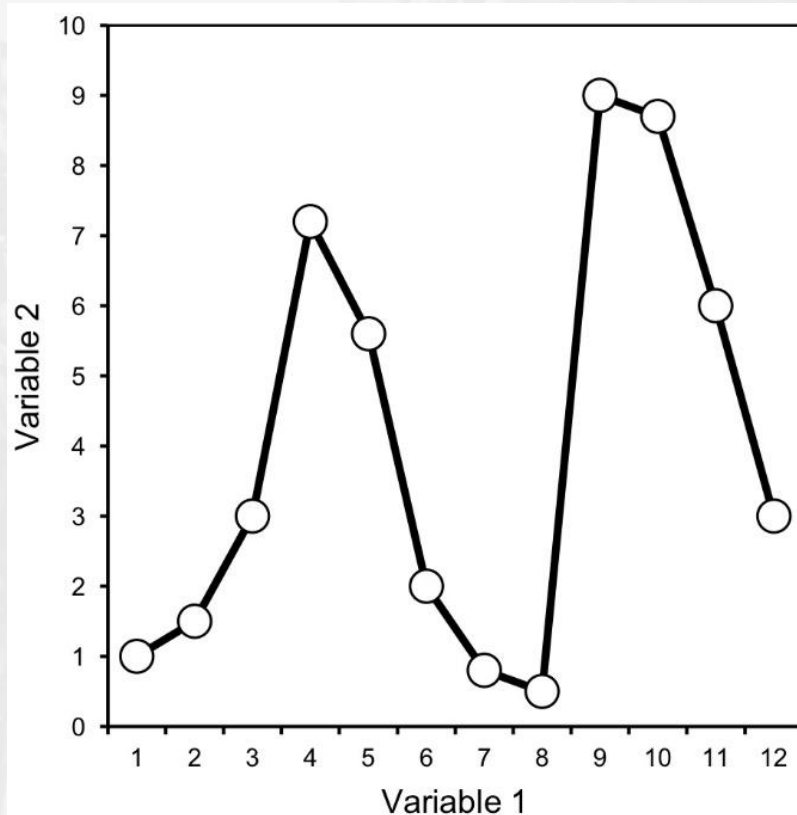
Tidak perlu memiringkan atau menggarisbawahi huruf tertentu jika tidak ada kepentingan



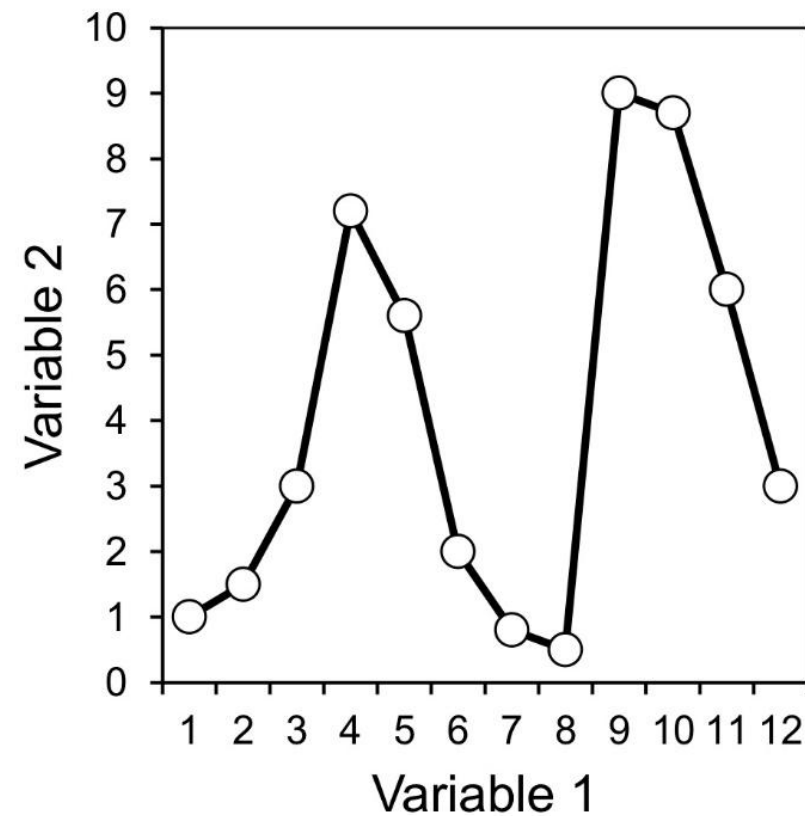


Ukuran huruf

Ukuran huruf minimal untuk pencetakan adalah 10 pt



6 pt 8 pt 10 pt 12 pt





Ketebalan garis

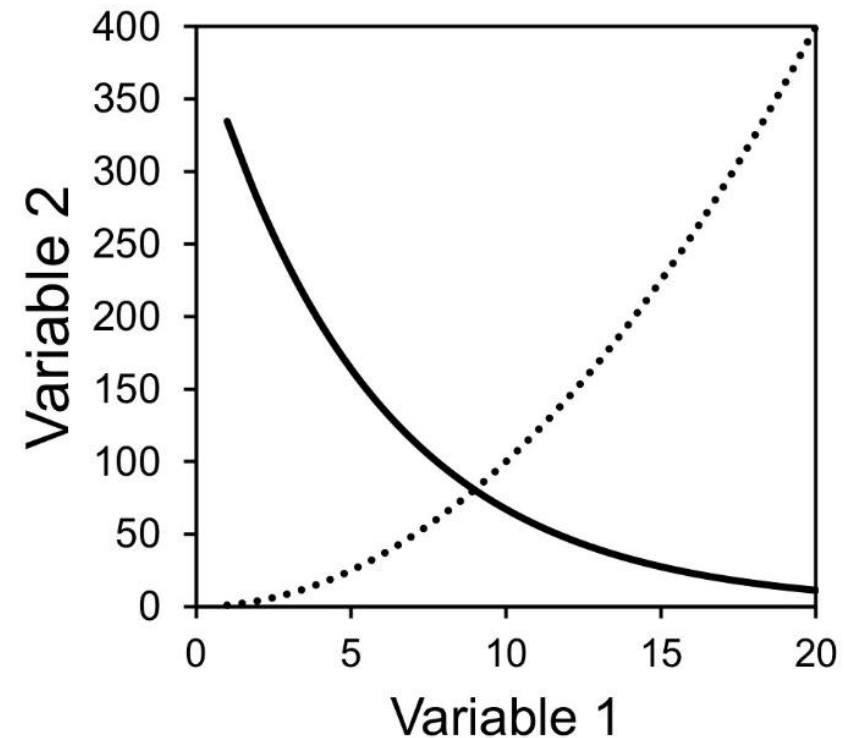
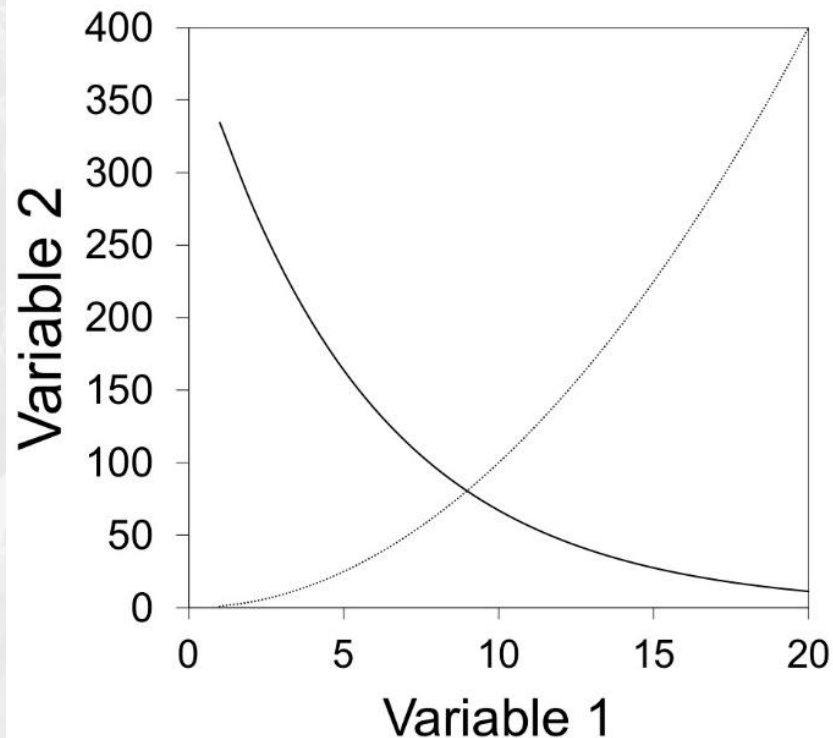
Ketebalan garis paling minimal adalah 0,75 pt.

0.75 pt

1 pt

1.5 pt

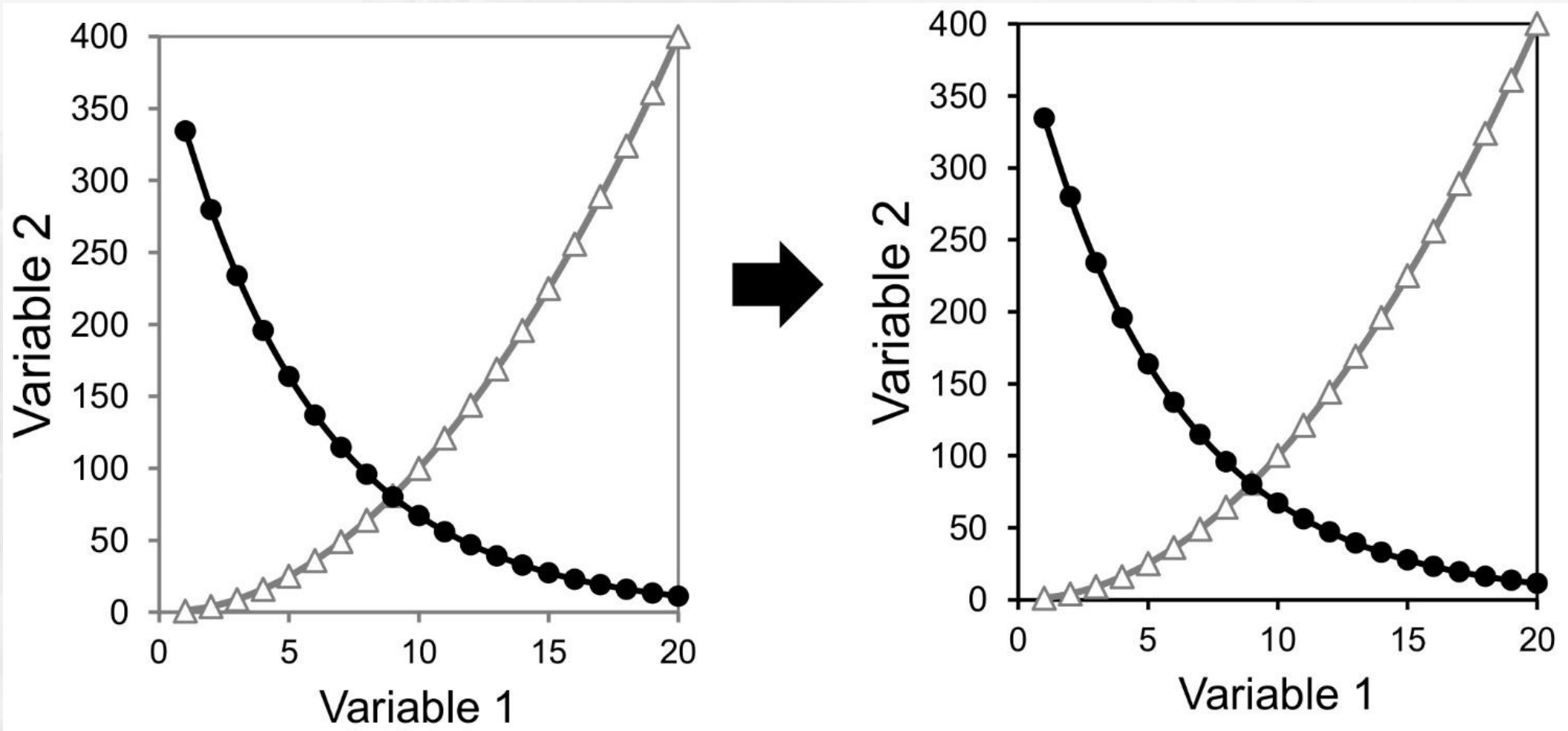
2.25 pt





Warna garis

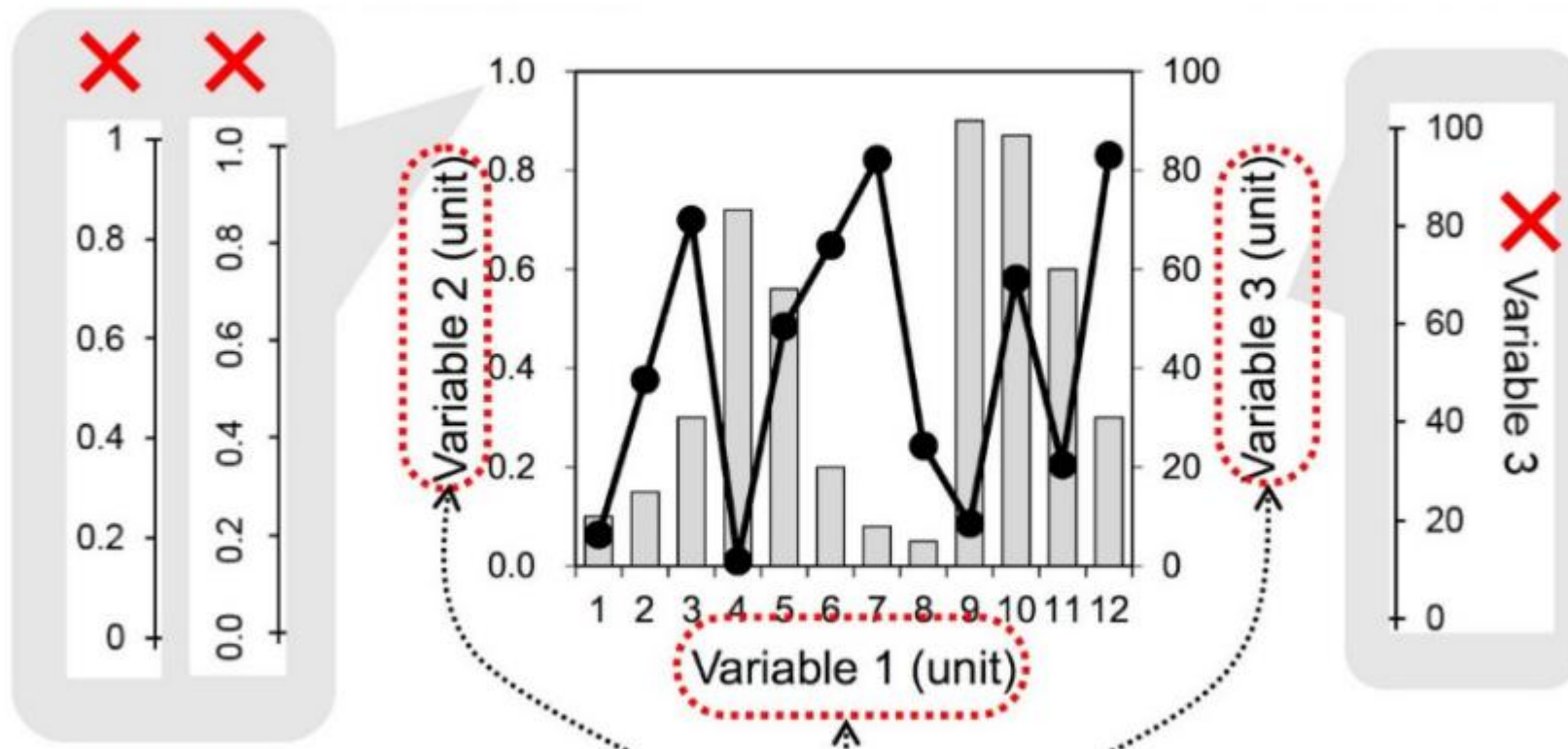
Gunakan warna hitam untuk *frame* maupun *border*, kecuali jika suatu saat dibutuhkan





Pelabelan sumbu grafik

Ada arah label tertentu yang dilazimkan dalam komunitas ilmiah

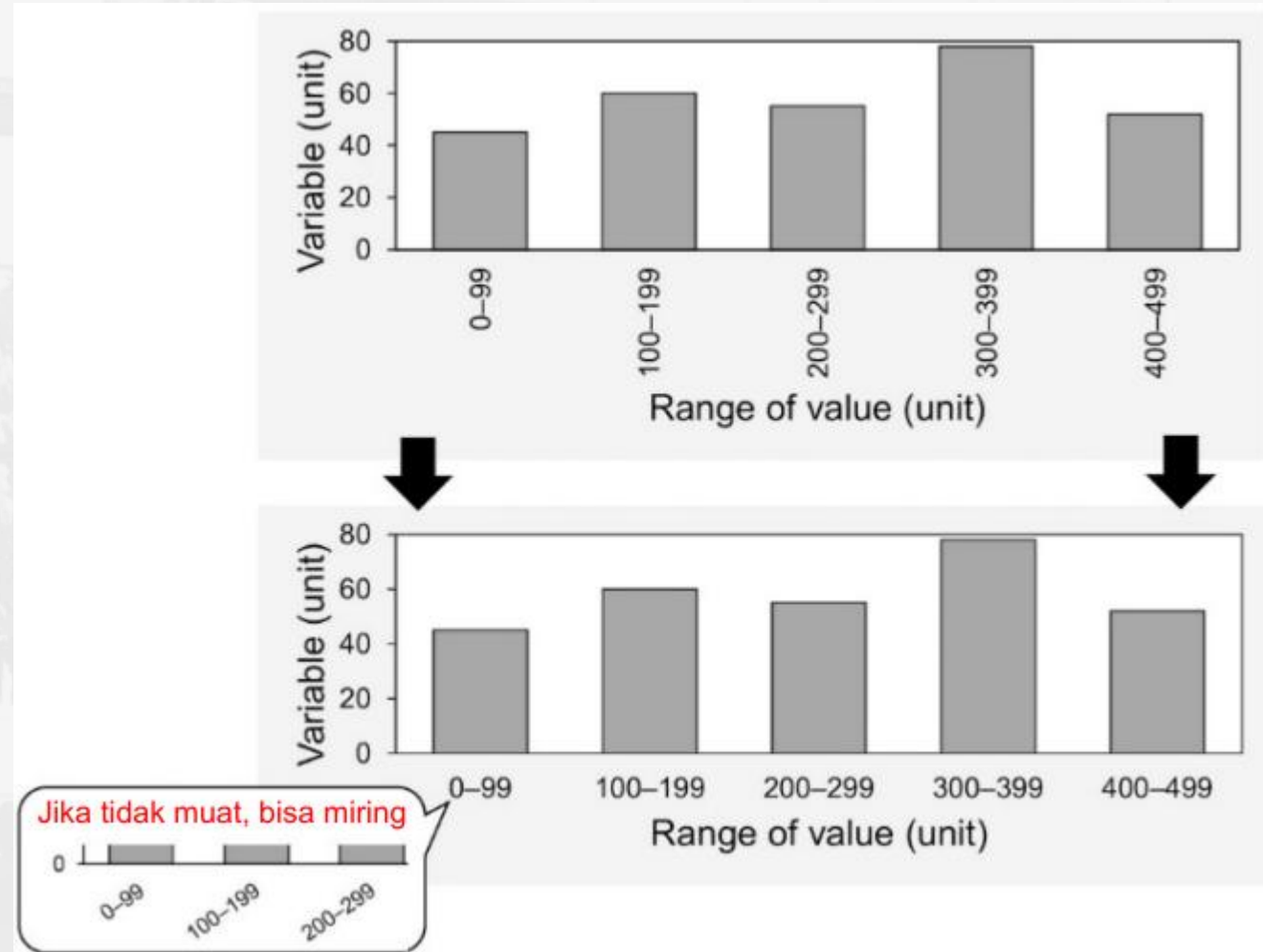


Setiap sumbu harus memiliki label dekat dengan nilai besaran



Pelabelan sumbu grafik

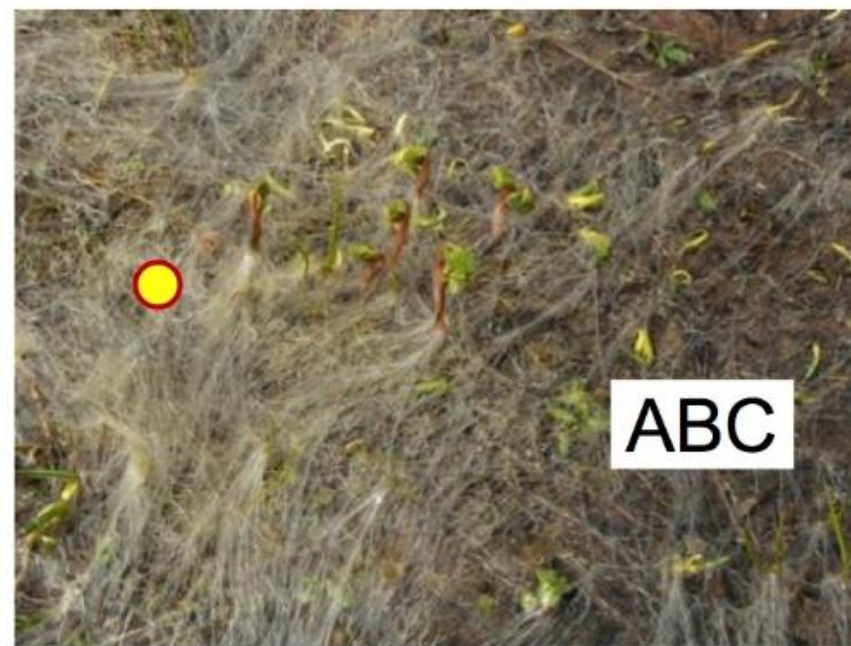
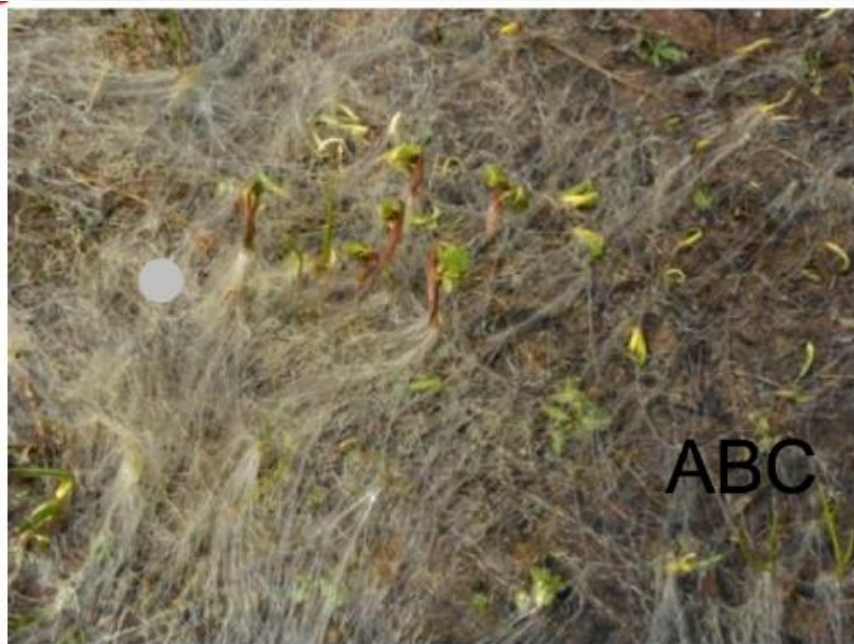
Nilai besaran berupa rentang sebisa mungkin ditampilkan horizontal





Tambahan teks atau simbol pada foto

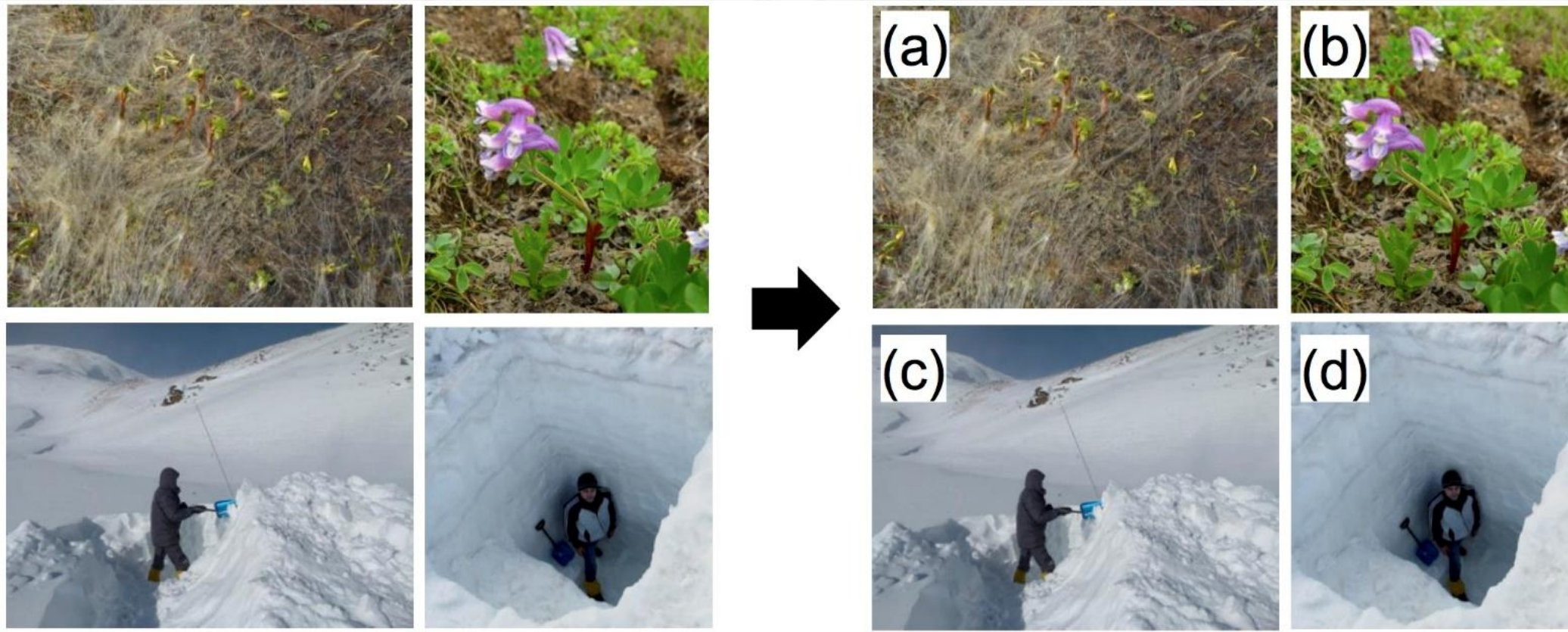
Jika menambahkan teks/symbol di atas foto atau gambar yang padat warna, perlu perhatikan pilihan latar belakang dari teks/symbol





Gambar dengan beberapa panel

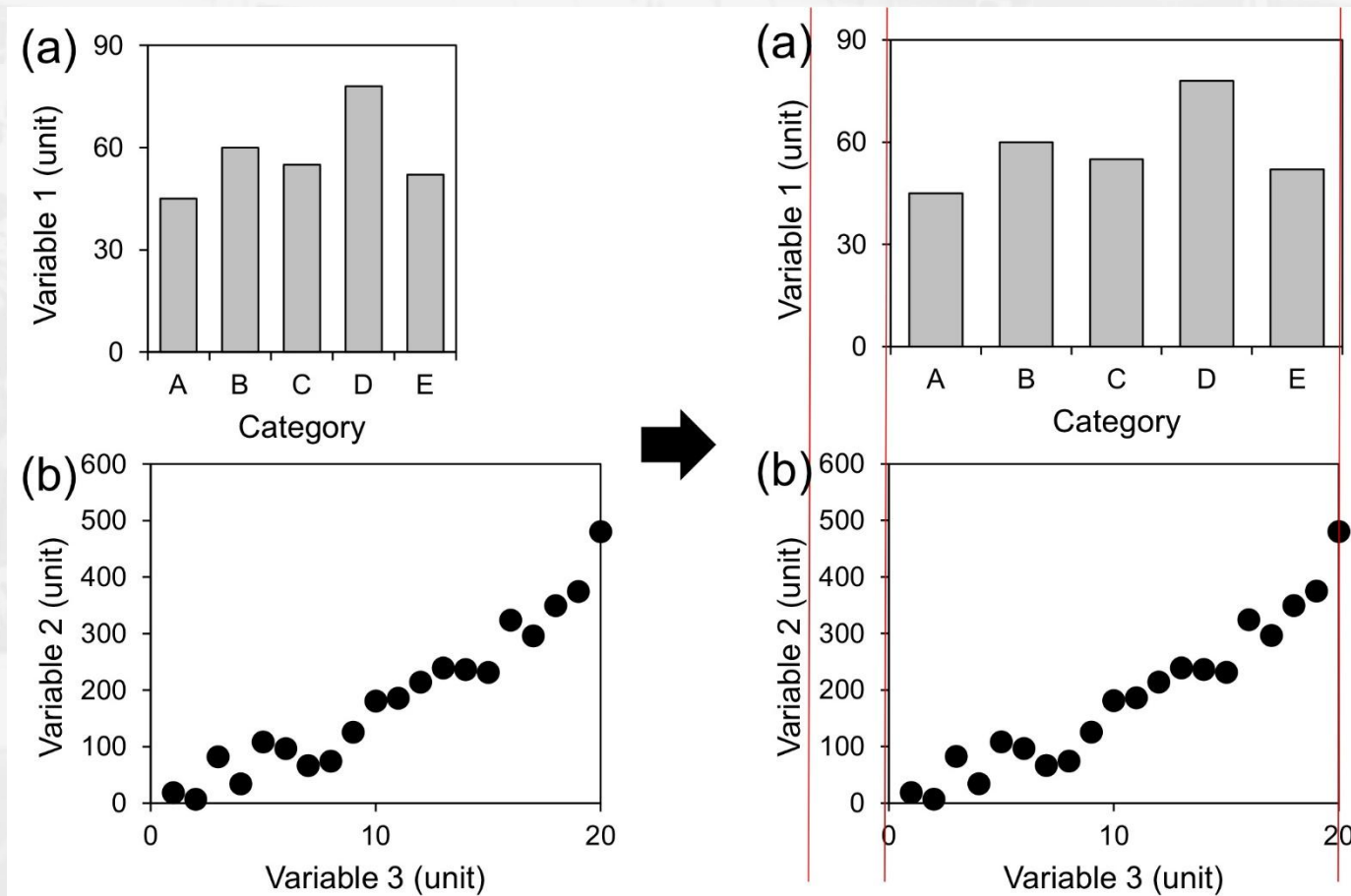
Label ada di setiap panel, sebisa mungkin gunakan huruf kecil minimal 10 pt dalam tanda kurung, letakkan di kiri atas, sejajarkan secara vertikal dan horizontal.





Gambar dengan beberapa panel

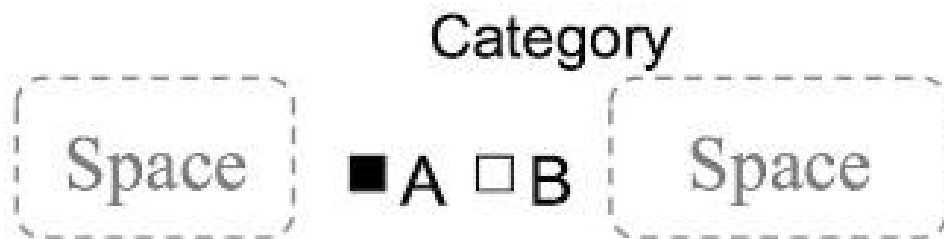
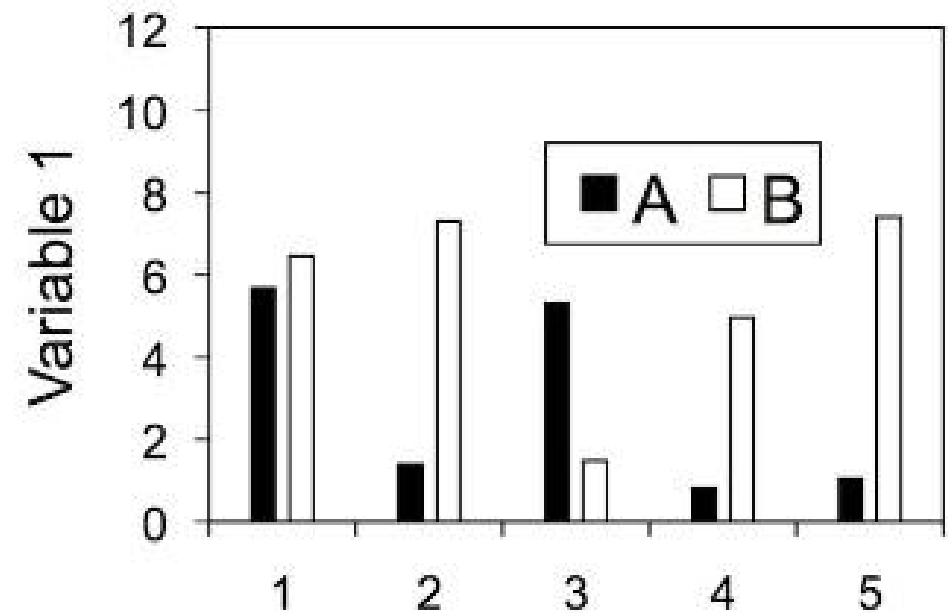
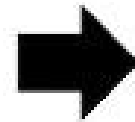
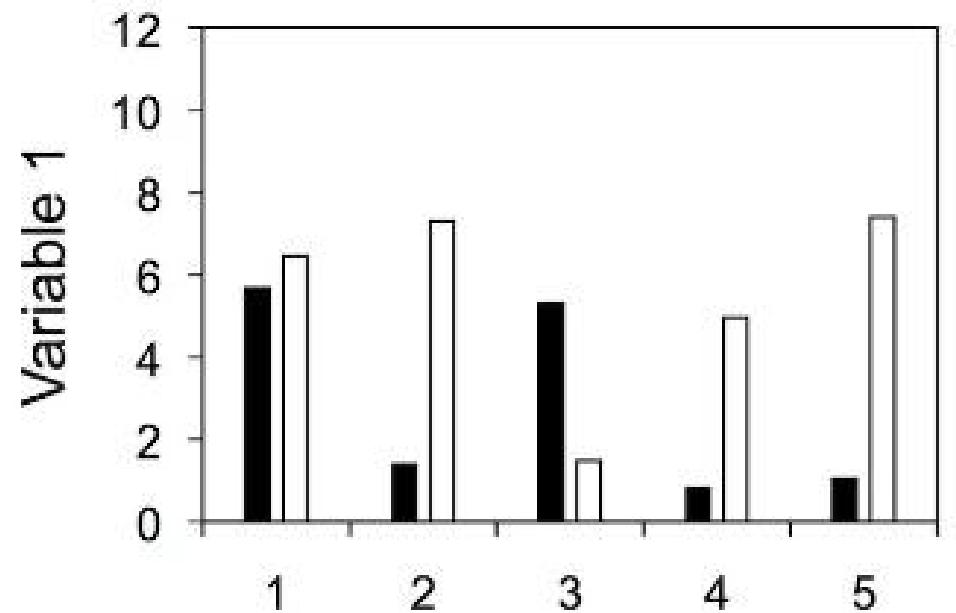
Ukuran panel usahakan seseragam mungkin





Pengaturan ruang agar tak mubazir

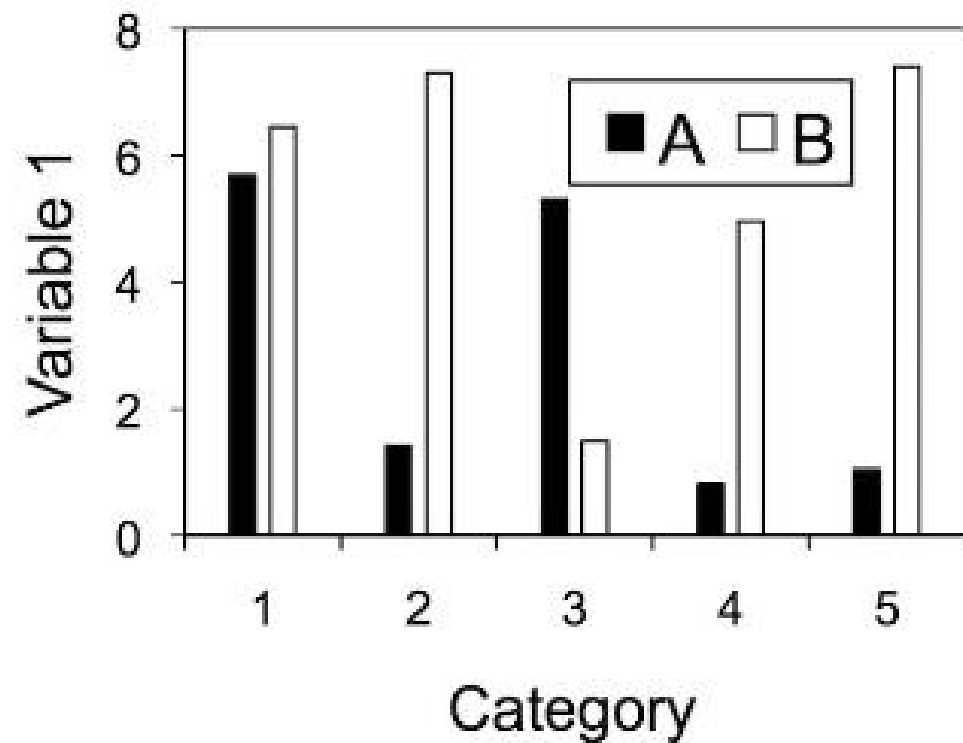
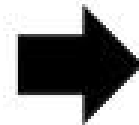
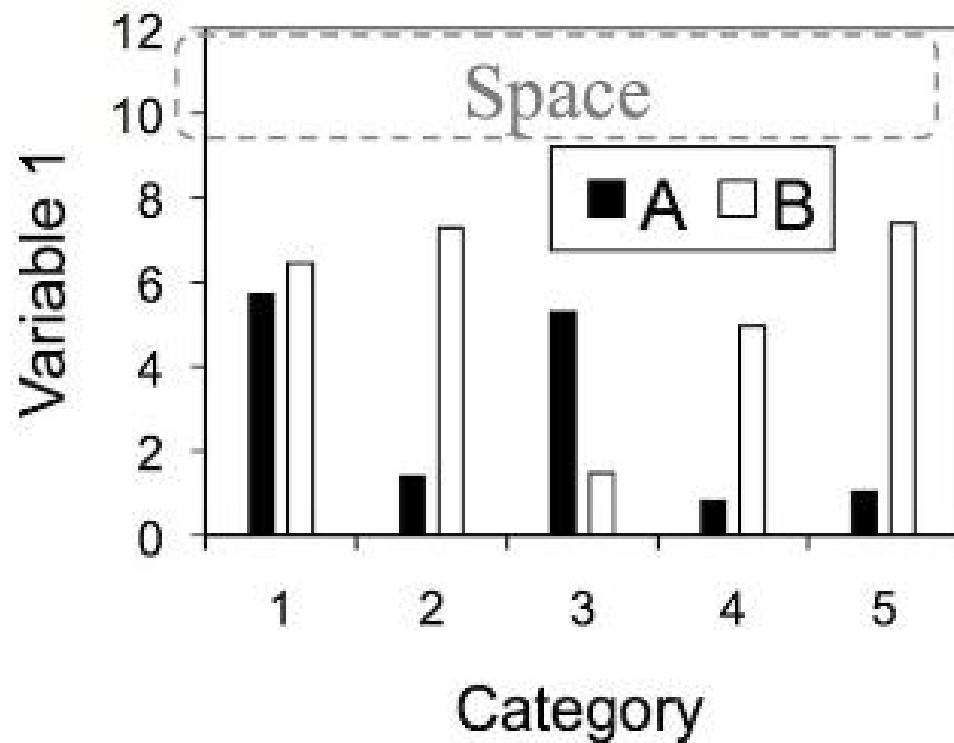
Atur posisi legenda





Pengaturan ruang agar tak mubazir

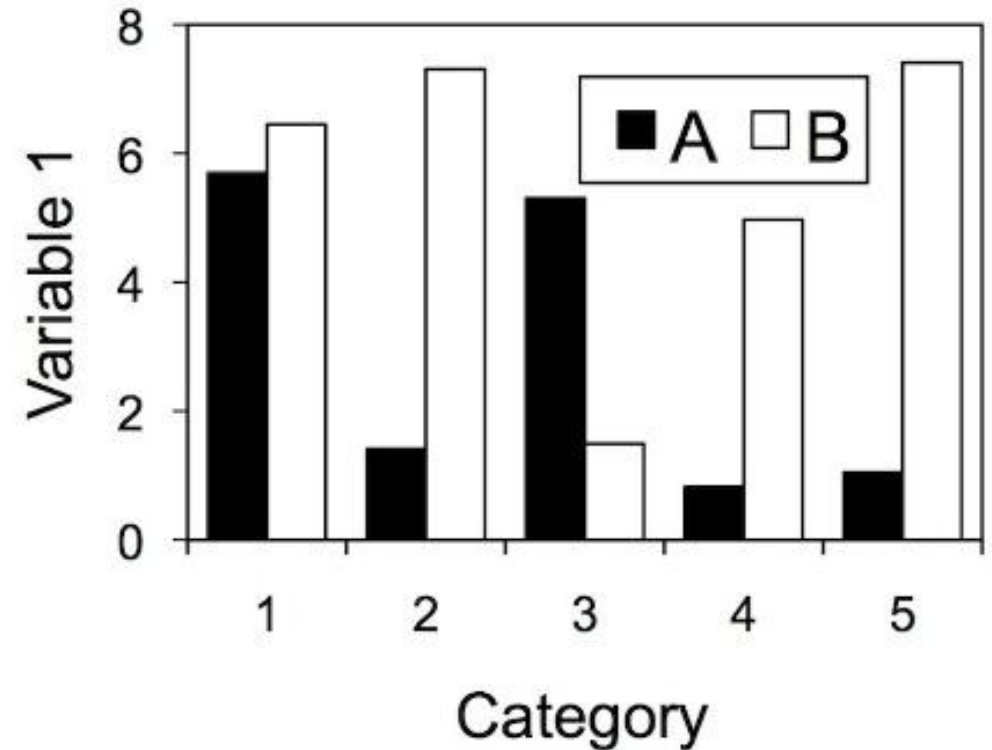
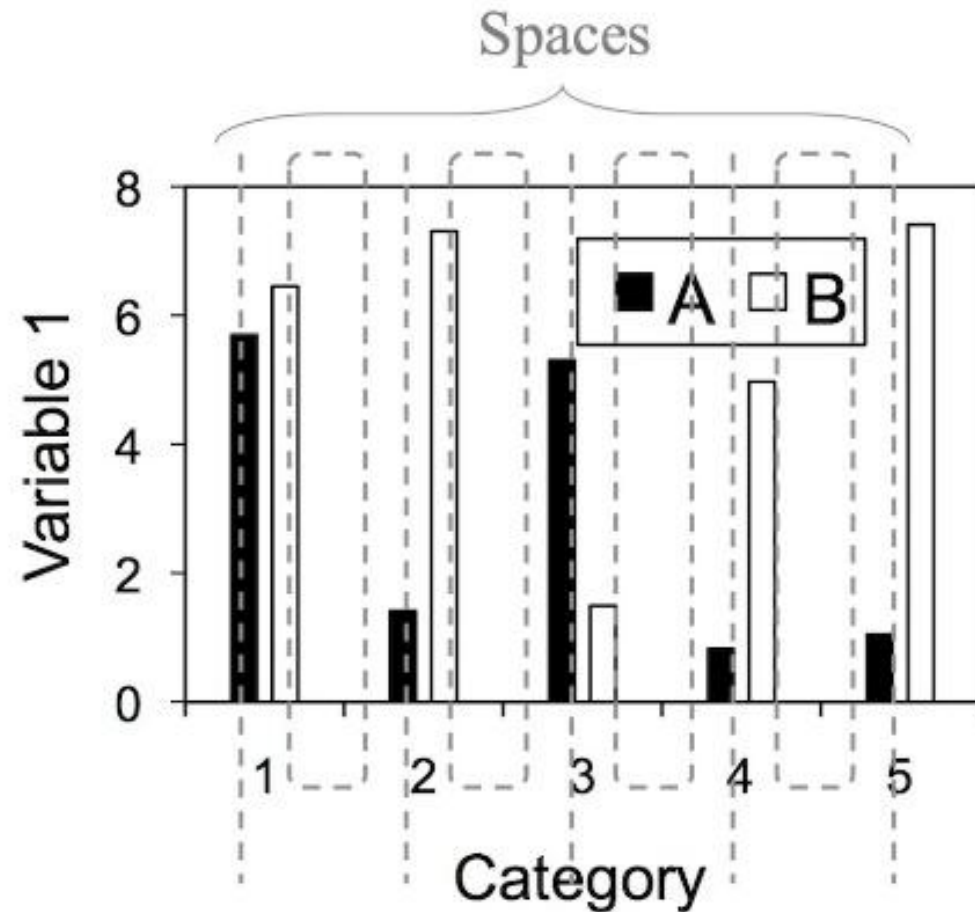
Buang ruang kosong





Pengaturan ruang agar tak mubazir

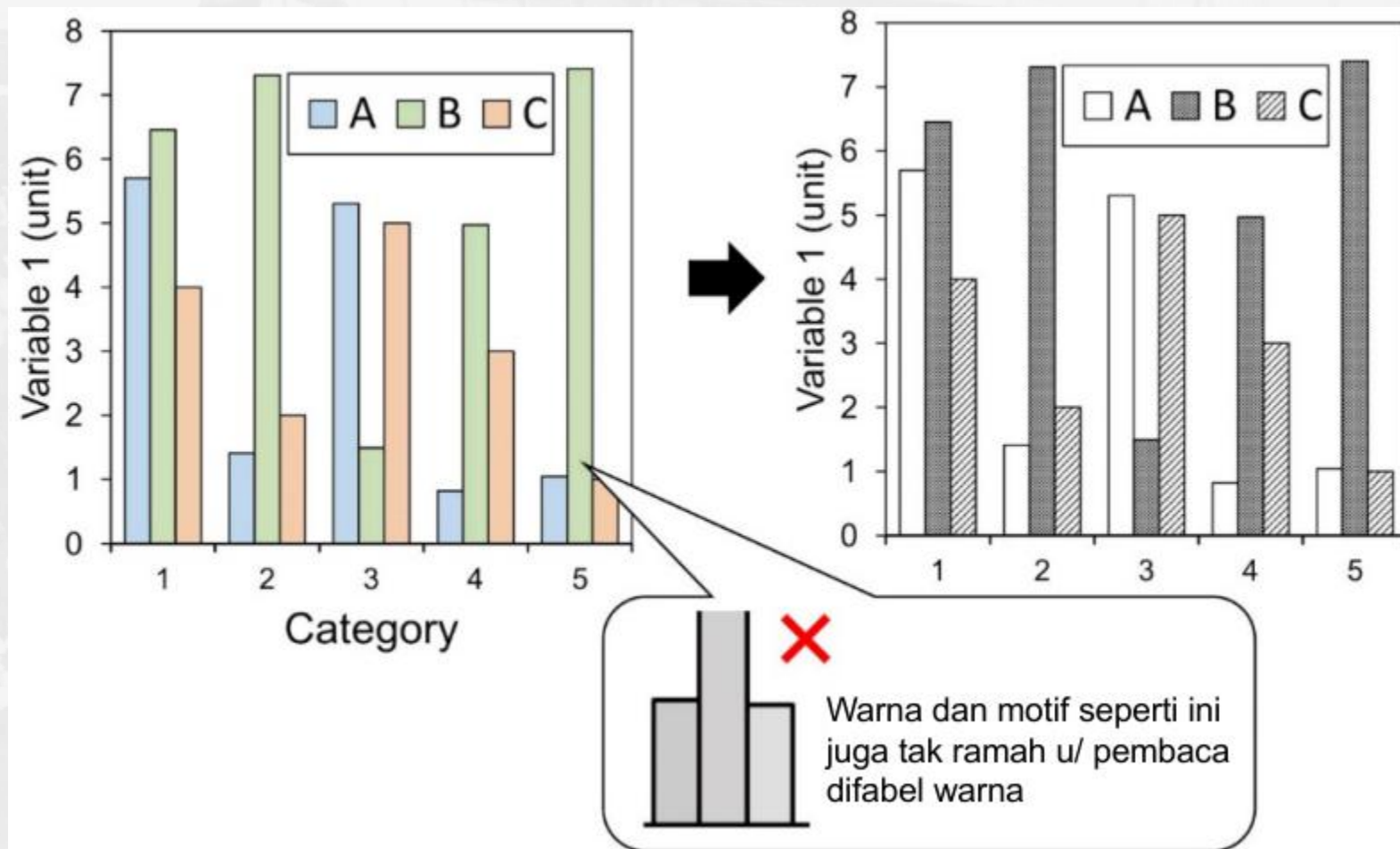
Buang ruang kosong





Pilihan warna & motif garis/bentuk

Ingat bahwa ketika dicetak, mayoritas penerbit akan mencetak hitam-putih





Implementasi dalam Python/Matplotlib

Python for Scientific Publications:

- <https://github.com/venkatesannaveen/python-science-tutorial>

Contoh realisasi dalam publikasi kami:

- <https://nbviewer.org/github/artnugraha/GermaniumTellurides>
- <https://nbviewer.org/github/artnugraha/DiracTE>
- dll.