# Some Errata and Updates for the Books

collected by Günter Rote

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[MCB p. 6; NMCB p. 8]

"**Problem 1.5** Any partition of a set of integers into finitely many APs can be obtained *only* in the following way: $N$ is partitioned into $k$ APs, each with the same constant difference $k$ (where $k$ is a positive integer greater than 1); then, one of these APs is partitioned into finitely many APs with the same constant difference, and, then, one of these APs (at this stage, we have APs of two different constant differences) is partitioned into finitely many APs with the same constant difference, etc."

Here, $N$ refers to the set of natural numbers, and an AP is an infinite arithmetic progression.

The statement of Problem 1.5 is subject to exceptions.

We denote APs as residue classes. For example, $3(\mathrm{mod}\ 5)$ is the AP $3, 8, 13, 18, 23, 28, \ldots$. The increment of the AP is equal to the modulus when the AP is considered as a residue class.

As an example, consider the partition illustrated below as parts of a clock-dial. $N$ is partitioned into the red class $0(\mathrm{mod}\ 4)$, the blue class $3(\mathrm{mod}\ 6)$, and seven black singleton classes $1, 2, 5, 6, 7, 10, 11(\mathrm{mod}\ 12)$.
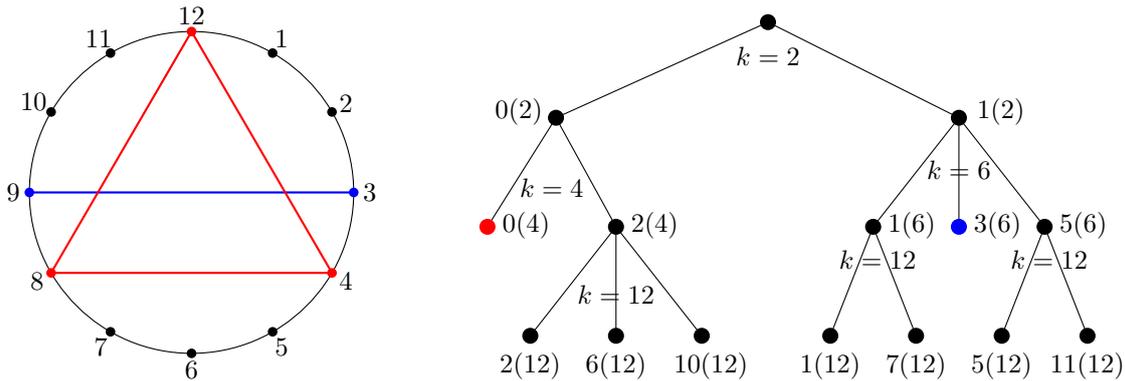


The right part of the figure shows how this partition can be obtained by hierarchic refinement, according to the procedure described in Problem 1.5: Initially $N$ is partitioned into even and odd numbers ($k = 2$); each class is further divided into some of classes with the same increment $k$, and so on.

For a counterexample, take the partition of the natural numbers into the 23 APs
- $A_1$: $0(\mathrm{mod}\ 6)$,
- $A_2$: $1(\mathrm{mod}\ 10)$,
- $A_3$: $2(\mathrm{mod}\ 15)$,
- and the 20 remaining classes $3, 4, 5, 7, 8,\ 9, 10, 13, 14, 15,\ 16, 19, 20, 22, 23,\ 25, 26, 27, 28, 29(\mathrm{mod}\ 30)$.

Modulo 30, the first AP $A_1$ consists of the residue classes $\{0, 6, 12, 18, 24\}$, the second AP $A_2$ is $\{1, 11, 21\}$, the third AP is $\{2, 17\}$, and the remaining singleton classes simply fill up the rest.

This is not obtainable by a series of refinements, because you cannot even get started with the first partitioning step:

- If the initial partition of $N$ is done with the increment $k = 2$, or any multiple of 2, you would cut the AP $A_3 = 2(\mathrm{mod}\ 15)$, because it contains both even and odd numbers.

- If the initial partition of $N$ is modulo $k = 3$, or modulo any multiple of 3, you would cut the AP $A_2 = 1(\mathrm{mod}\ 10)$.

- If the initial partition of $N$ is modulo $k = 5$, or modulo any multiple of 5, you would cut the AP $A_1 = 0(\mathrm{mod}\ 6)$.

- Any other increment $k > 1$, which is not a multiple of 2, 3, or 5, would cut all APs.

[MCB Chapter 12, p. 86]

"We will discuss Grötzsch's reasons for discovering this graph in Section 19.3" ⤳ Section 19.4

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[MCB Chapter 29, p. 278; NMCB Chapter 31.4, p. 334]

The "best known [today] upper bound" on the Erdős-Szekeres function for convex $n$-gons:

$$ES(n) \leq \binom{2n-5}{n-2} + 1$$

There was a breakthrough reduction of this bound, which is roughly $4^n$, to $2^{n+o(n)}$ by Andrew Suk in 2016 [6]. The bound has been further improved since then.[1]

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[MCB Chapter 33, p. 309; NMCB Chapter 35, p. 385]

... "presented it the following year [1927] at the meeting of *D.M.V., Die Deutsche Mathematiker Vereinigung* (The German Mathematical Society) in Berlin."

According to [MCB Section 36.6, p. 383; S+S, p. 47; NMCB Section 39.7, p. 464], this meeting took place not in Berlin, but in *Bad Kissingen*: "At the Bad Kissingen September 1927 annual meeting of the *Deutsche Mathematiker-Vereinigung* (*DMV* for short, the German Mathematical Society), ..."

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[MCB Chapter 12, p. 326]

"Fürer" ⤳ Führer

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[MCB, p. 368, footnote 53; S+S, p. 8, footnote 14]

Citation from Rüdiger Thiele: "It is natural that in particular Jewish emigrants have attacked van der Waerden for his stay in Nazi Germany." ⤳ "It has been held against Van der Waerden, naturally in particular by Jewish emigrants, that he stayed in Nazi Germany." The (complete) original German sentence is: *Man hat, und das natürlich besonders von Seiten jüdischer Emigranten, van der Waerden sein Verbleiben im nationalsozialistischen Deutschland vorgehalten, da er ja Möglichkeiten gehabt hätte, das Land zu verlassen.*

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[MCB, p. 381; S+S, p. 41; NMCB, p. 461], letter from Courant to Van der Waerden:

"Herr Artin has sent me a copy of the enclosed letter about which I am somewhat astonished and concerned." ⤳ Herr Artin has sent me the letter whose copy is enclosed, about which ...

The original German text is in facsimile in [S+S, p. 41]: "Herr Artin hat mir den in Abschrift beifolgenden Brief zugesandt, über den ich einigermassen erstaunt und betroffen bin."

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[MCB, p. 381; S+S, p. 41] letter from Courant to Van der Waerden:

"I hope you have not angered him." ⤳ Hopefully you did not get angry.

The original German text is in facsimile in [S+S, p. 41]: "Hoffentlich haben Sie sich nicht geärgert."[2] This translation error has been fixed in [NMCB, p. 461].

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[MCB, p. 400; S+S, p. 104; NMCB, p. 479], letter from Courant to Van der Waerden:

"I believe I will suggest to the Americans that this time they could spend their money better than to get me out because I still have a position that I can keep." ⤳ I believe I will suggest to the Americans that, in these times, they could spend their money .... The original German text, according to [3, p. 135]: *Ich glaube ich werde den Amerikanern suggerieren, daß sie in dieser Zeit ihr Geld besser verwenden können als mich, der ich ja noch eine Stelle habe, herauszuholen.*[3]

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[S+S, p. 69] "famous spy Paul Rosebud" ⤳ Paul Rosbaud

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[S+S, p. 146] "*mise-an-scéne*" ⤳ *mise en scène*

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[S+S, p. 195] "Blu-Wannsee" ⤳ Bln-Wannsee (probably; Bln stands for Berlin.)

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[S+S, p. 253] "I have made some mistakes. But I have never pacified the Nazis." ⤳ "I have never pactified with the Nazis," as noted in [5, p. 927–928], see [4]. The meaning of this faulty English expression is something like "I have never made a pact with the Nazis" or "I have never come to terms with the Nazis."

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[S+S, p. 314] "Oberscharfürer" ⤳ Oberscharführer

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[S+S, p. 339] Citation from Erich Bagge's diary: "The story found widespread but not generated agreement." ⤳ ... "but not general agreement." The original German text, according to [2, p. 416], which in turn refers to [1, p. 56–58] is: "Die Geschichte fand zwar weitgehende aber nicht allgemeine Billigung."

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[1]See for example the Wikipedia article `https://en.wikipedia.org/wiki/Happy_ending_problem`.
[2]This error is also pointed out by Reinhard Siegmund-Schultze in his book review of [S+S]: [5, p. 927].
[3]This translation error has been pointed out by Reinhard Siegmund-Schultze in his book review of [S+S] [5].

# References

[1] Erich Bagge, Kurt Diebner, and Jay Kenneth. *Von der Uranspaltung bis Calder Hall*. Rowohlt, Hamburg, 1957.

[2] Dieter Hoffmann, editor. *Operation Epsilon. Die Farm-Hall-Protokolle erstmals vollständig, ergänzt um zeitgenössische Briefe und weitere Dokumente der 1945 in England internierten deutschen Atomforscher.* GNT-Verlag, Berlin, 2023. `doi:10.47261/1508`.

[3] Reinhard Siegmund-Schultze. *Mathematiker auf der Flucht vor Hitler: Quellen und Studien zur Emigration einer Wissenschaft.* Vieweg, 1998.

[4] Reinhard Siegmund-Schultze. Bartel Leendert van der Waerden (1903–1996) im Dritten Reich: Moderne Algebra im Dienste des Anti-Modernismus? In Dieter Hoffmann and Mark Walker, editors, *"Fremde" Wissenschaftler im Dritten Reich. Die Debye-Affäre im Kontext*, pages 200–229. Wallstein Verlag, Göttingen, 2011.

[5] Reinhard Siegmund-Schultze. Van der Waerden in the Third Reich. *Notices of the American Mathematical Society*, 62:924–929, 2015. `doi:10.1090/noti1271`.

[6] Andrew Suk. On the Erdős-Szekeres convex polygon problem. *J. Amer. Math. Soc.*, 30:1047–1053, 2017. `doi:10.1090/jams/869`.