Unit 15, part 81.1

Aphorisms, advices, anecdotes, brain teasers, curious stories, epigrams, epigraphs, epitaphs, crazy-creative ideas, suggestions and set pieces for thriller and mystery writers, koans, memorabilia, mottos, poems, proverbs, riddles, quotations, sayings, slogans, scurrilities, besun, etc., collected for encouragement and the advantage of my students and of myself.

Wort-Fundstücke, Gehörtes, Gelesenes, Zugelaufenes, Angeschwemmtes, Ernächtetes, …

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A remarkable connection

Natural numbers meet two-digit palindromic prime twins (13,31), (17,71), (37,73), (79,97)

$$\frac{97-79}{31-13} = 1 \; ; \frac{97^2-79^2}{31^2-13^2} = 4$$

$$\frac{73-37}{31-13} = 2 \; ; \frac{73^2-37^2}{31^2-13^2} = 5$$

$$\frac{71-17}{31-13} = 3 \; ; \frac{71^2-17^2}{31^2-13^2} = 6$$

** Discussion, esp. what about the „semis“

$$\frac{53-35}{31-13} = 1 \; ; \frac{53^2-35^2}{31^2-13^2} = 2$$

$$\frac{91-19}{31-13} = 4 \; ; \frac{91^2-19^2}{31^2-13^2} = 10 \qquad ?$$

** Go to k-digit palindromic prime twins, k=3,4,5,….

** Discuss „meeting patterns“.

** Discuss the counting function

d(k) := number of k-digit palindromic prime twins, k=3,4,5,… ;
d(2)=4, d(3)=14, …

** Discuss the palindromic prime twin sequences

(13,31)

(113,311)

(1103,3011)

(11003,30011) .

↓?

See also “Palindromic prime”

[1] Weisstein, Eric W. "Palindromic Prime." From *MathWorld*--A Wolfram Web Resource. https://mathworld.wolfram.com/PalindromicPrime.html

[2] https://en.wikipedia.org/wiki/Palindromic_prime
https://de.wikipedia.org/wiki/Primzahlpalindrom

[3] http://users.skynet.be/worldofnumbers/palprim1.htm

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Stop hurricanes

https://www.oceantherm.no/

https://www.oceantherm.no/our-story
https://www.oceantherm.no/how-it-works
→ Algorithmics?
Stop forest fire?
See Unit 16, self-running phenomena

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Wanderdynamik "gekoppelter" Sanddünen

K.A. Bacik et al. Wake Induced Long Range Repulsion of Aqueous Dunes.
Phys. Rev. Lett. 124, 054501, 2020
https://doi.org/10.1103/PhysRevLett.124.054501
→ Algorithmics?

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Multistage algorithmic systems

** See Units 1,15part58,15part59.1,19,44,47, 60,66,138,902
Debs 16,111

** https://www.spektrum.de/news/ki-macht-vorstellungen-sichtbar/1774065#Echobox=1600934722?utm_source=pocket-newtab-global-de-DE

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Causality or correlation?

Weibiao Zeng, Xiaolin Wang, Junyu Li, et al. Association of Daily Wear of Eyeglasses With Susceptibility to Coronavirus Disease 2019 Infection.

JAMA Ophthalmology.
doi:10.1001/jamaophthalmol.2020.3906
https://jamanetwork.com/journals/jamaophthalmology/fullarticle/2770872?guestAccessKey=90df3083-7df3-4152-a3ca-edda946a76c6&utm_source=For_The_Media&utm_medium=referral&utm_campaign=ftm_links&utm_content=tfl&utm_term=091620
https://app.handelsblatt.com/technik/digitale-revolution/datenanalysefirma-ueberraschend-muehselig-und-europaeisch-einblicke-in-das-geschaeft-von-palantir/26222332.html?utm_source=pocket-newtab-global-de-DE

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Two exclamation/question marks!!/??

https://www.faz.net/aktuell/karriere-hochschule/**eine-vertrauensbasis-fuer-das-internet-blockchain-forschung-erobert-die-universitaeten-**16909837.html
https://www.faz.net/asv/wirtschaftsraeume-im-wandel-1/innovativer-digitaler-zahlungsverkehr-16957716.html
https://www.faz.net/aktuell/karriere-hochschule/buero-co/mint-faecher-**versicherungen-sorgen-sich-um-mathematiker-nachwuchs-**16952468.html?utm_source=pocket-newtab-global-de-DE
https://www.zeit.de/zeit-wissen/2020/04/versicherungen-mathematik-solidaritaet-glueckksspiel-lebensversicherung?utm_source=pocket-newtab-global-de-DE

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Flying techniques of Syrphidae [1] and Bombyliidae [2] → **Algorithmics?**

[1] https://en.wikipedia.org/wiki/Hoverfly
[2] https://en.wikipedia.org/wiki/Bombyliidae

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„Weit in die Ferne schweift sein Blick“ Photo Shen Li

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Finden Sie einen möglichst einfachen **Entscheidungsalgorithmus**:

Eine gegebene natürliche Zahl k
** ist eine **Fibonacci-Zahl** fib(n)
** liegt innerhalb der (-i,+i)-Umgebung; i=1,2,3,…
einer Fibonacci-Zahl fib(n):
$fib(n) - i \leq k \leq fib(n) + i$.

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Die **Determinante** der **Primzahltripel**
(1597,28657,514229) →

$$\begin{vmatrix} 1597 & 28657 \\ 28657 & 514229 \end{vmatrix} = 64 = 8^2$$

(5,89,1597) →

$$\begin{vmatrix} 5 & 89 \\ 89 & 1597 \end{vmatrix} = 64 = 8^2$$

ergibt eine **Quadratzahl**.
Mehr:
(17,23,29) →

$$\begin{vmatrix} 23 & 29 \\ 17 & 23 \end{vmatrix} = 36 = 6^2$$

aber

$$\begin{vmatrix} n & n+k \\ n-k & n \end{vmatrix} = k^2$$ **für alle n,k∈ℕ**

Finden Sie weitere Primzahltripel-Quadratzahl Konstellationen.
Läßt sich aus aus diesem „experimentellen Material“ eine Gesetzmäßigkeit destillieren?

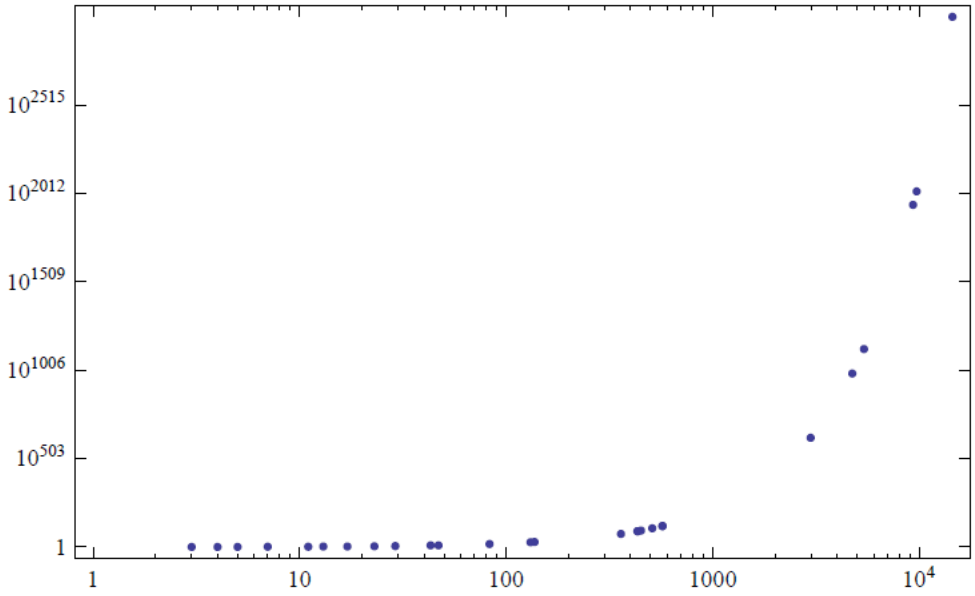
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Diskutieren Sie die **Verteilung der Primzahlen innerhalb der Fibonacci-Zahlenfolge** [1,2,3], Näherungsgleichung? vgl. Primzahlfunktion π(n) [4,5]), Kettenbruchanalyse, …

n	fib(n)	
1	1	
2	1	
3	2	
4	3	
5	5	
6	8	
7	13	13:**7**=[1;1,**6**]
8	21	
9	34	
10	55	
11	89	89:**11**=(9,-1,-**10**]
12	144	
13	233	233:**13**=[17;1,**12**] 233:26=[8;1,25]
14	377	
15	610	
16	987	
17	1597	1597:**17**=[93;1,**16**] 1597:34=[46;1,33]
18	2584	
19	4181	??
20	6765	
21	10946	
22	17711	
23	28657	28657:**23**=[1245;1,**22**] 28657:46=[622;1,45]
24	46368	
25	75025	
26	121393	
27	196418	
28	317811	
29	514229	514229:**29**=[17733;-1,-**28**]
30	832040	

31 1346269 ??
32 2178309
33 3524578
34 5702887
35 9227465
36 14930352
37 24157817 ??
38 39088169
39 63245986
40 102334155
41 165580141 ??
42 267914296
43 433494437 433494437:**43**=[10081265;1,**42**]
433494437:86=[5040632;1,85]
44 701408733
45 1134903170
46 1836311903
47 2971215073 2971215073:**47**=[63217341;1,**46**]
2971215073:94=[31608670;1,93]

48 4807526976
.....
571 960412006189225538239428833609248650261049174118770678168222647890290143783084788641925890841852543316376461830080746290
.....



[1] Weisstein, Eric W. "Fibonacci Prime." From *MathWorld*--A Wolfram Web Resource. https://mathworld.wolfram.com/FibonacciPrime.html

[2] https://en.wikipedia.org/wiki/Fibonacci_prime

[3] https://de.wikipedia.org/wiki/Fibonacci-Primzahl

[4] Weisstein, Eric W. "Prime Counting Function." From *MathWorld*--A Wolfram Web Resource. https://mathworld.wolfram.com/PrimeCountingFunction.html

[5] https://en.wikipedia.org/wiki/Prime_number_theorem

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29.09.2020 EPScolalg DScalc