Unit 15, part 76.2

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, …

The scf equation

$$z = [2^n; (2^k, 2^{n+1},)\text{per}]^2 = (2^n)^2 + \frac{2^{n+1}}{2^k}$$

$$= 2^{2n} + 2^{n+1-k};$$

$$n,k \in \mathbb{Z} \qquad (1)$$

is inspired by Unit 15, part 74, „3heiten Zusammenschau“.

Examples

n=5, k=1 → z=1056 ok
n=5, k=4 → z=1028 ok
n=5, k=5 → z=1026 ok
n=4, k=4 → z=258 ok

n=1, k=5 → z=33/8 ok
n=2, k=5 → z=65/4 ok
n=3, k=5 → z=129/2 ok
n=4, k=5 → z=257 ok
** Try to reconstruct this connection following „Sherlock Holmes Science of Deduction“ [1].
** Proof equ. (1).
** How about n,k∈ℝ ?
n=e, k=π → z=44.79948309547132… ok
Check more.
** Experiment with broadband extensions of equ. (1).

Reference

[1] C. Doyle. The Penguin Complete Sherlock Holmes.
A Study in Scarlet. Chapter 2. The Science of Deduction.
ISBN 0-14-005694-7

Nachtrag zu **Unit 15, part 75.2**, „Allein mit Windkraft“

** Energiebilanz ?
** Lateral „Out of the box“
** „Windwagen“ → Triebwerk
** Wind → Sonnenwind
** v_{Wind} → c ?

References

[1] H. Urbitsch. Windkraftantrieb für Fahrzeuge. DDR Patentschrift 146 429 (11.02.1981)
[2] https://www.spektrum.de/alias/bilder-der-woche/ueberrueckenwindschnell/1035421
[3] https://en.wikipedia.org/wiki/Blackbird_(land_yacht)
[4] https://www.wired.com/2010/08/ddwfttw/
[5] https://de.wikipedia.org/wiki/Segelwagen
[6] https://www.daserste.de/information/wissen-kultur/w-wie-wissen/sendung/wind-114.html
[7] http://www.windenergyevents.com/
[8] https://www.google.com/search?q=Aeolus+Hochschule+Emden&client=firefox-b&sa=N&tbm=isch&tbo=u&source=univ&ved=2ahUKEwj9ksnx9oDdAhVowAIHHSL6AqI4ChCwBHoECAYQAQ&biw=1280&bih=579

Extended Babylon Unit 1

Input Startwert $x(0)=a$
Radikand A positiv, reell
Rekursion Heron

$$x(t+1)=\frac{1}{2}\left(x(t)+\frac{A}{x(t)}\right) \qquad (1)$$

Beispiel
a=2, A=7
⟨x(t)⟩={2.000000000000000000000000000, 2.750000000000000000000000000, 2.647727272727272727272727273, 2.645752048380803745610612563 40, 2.645751311064693327868579920 60, 2.645751311064590590501615755 63, 2.645751311064590590501615753 64, 2.645751311064590590501615753 64, 2.645751311064590590501615753 64,…}
→ $x(\infty)=\sqrt{7}$

Input Startwerte x(0)=a, y(0)=b
„Radikand“ A positiv, reell
Rekursion Heron Flip-Flop

$$y(t+1)=x(t) \qquad (2.1)$$

$$x(t+1)=\frac{1}{2}\left(x(t)+\frac{\text{flipflop}(A,y(t))}{x(t)}\right) \qquad (2.2)$$

Beispiel 1
a=2, b=3, A=7

⟨x(t)⟩ = {2.0000000000000000000, 2.7500000000000000000,
1.7386363636363636364, 2.8823900772430184195, 1.7427913384011966494,
2.8796682161658781023, 1.7424369094434424329, 2.8798995042513404197,
1.7424667161501504459, 2.8798800470247428297, 1.7424642064119899136,
2.8798816852866822614, 1.7424644177114143923, 2.8798815473581059809,
1.7424643999215776370, 2.8798815589706618634, 1.7424644014193482181,
2.8798815579929718992, 1.7424644012932471817, 2.8798815580752860527,…}
⟨y(t)⟩ = {3.0000000000000000000, 2.0000000000000000000,
2.7500000000000000000, 1.7386363636363636364, 2.8823900772430184195,
1.7427913384011966494, 2.8796682161658781023, 1.7424369094434424329,
2.8798995042513404197, 1.7424667161501504459, 2.8798800470247428297,
1.7424642064119899136, 2.8798816852866822614, 1.7424644177114143923,
2.8798815473581059809, 1.7424643999215776370, 2.8798815589706618634,
1.7424644014193482181, 2.8798815579929718992, 1.7424644012932471817,…}

Interpretieren Sie x(∞)=flipflop(1.74246440129…, 2.8798815579…) .

Beispiele 2-6

a=2, b=4

A=8:
⟨x(t)⟩ = {2.0000000000000000000, 3.0000000000000000000,
1.8333333333333333333, 3.0984848484848484848, 1.8450859450248203304,
3.0904636651965612507, 1.8437446360011105095, 3.0913701551172950764,
1.8438934032340880085, 3.0912695013972369084, 1.8438768487105611649,
3.0912807005475513285, 1.8438786901928842018, 3.0912794547657873031,
1.8438784853428379118, 3.0912795933487402351, 1.8438785081306492900,
3.0912795779325722082, 1.8438785055956993700, 3.0912795796474895608,…}
⟨y(t)⟩ = {4.0000000000000000000, 2.0000000000000000000,
3.0000000000000000000, 1.8333333333333333333, 3.0984848484848484848,
1.8450859450248203304, 3.0904636651965612507, 1.8437446360011105095,
3.0913701551172950764, 1.8438934032340880085, 3.0912695013972369084,
1.8438768487105611649, 3.0912807005475513285, 1.8438786901928842018,
3.0912794547657873031, 1.8438784853428379118, 3.0912795933487402351,
1.8438785081306492900, 3.0912795779325722082, 1.8438785055956993700,…}
A=9:
⟨x(t)⟩ = {2.0000000000000000000, 3.2500000000000000000,
1.9326923076923076923, 3.2947043628013777268, 1.9406550236091174815,
3.2891322170484415006, 1.9395762959454179945, 3.2898824950767712560,
1.9397202098338394193, 3.2897823169897008774, 1.9397009700462680494,
3.2897957082771393366, 1.9397035414896067778, 3.2897939184733157845,
1.9397031977973028763, 3.2897941576932808440, 1.9397032437340771685,
3.2897941257199246907, 1.9397032375943160764, 3.2897941299933801999,…}
⟨y(t)⟩ = {4.0000000000000000000, 2.0000000000000000000,
3.2500000000000000000, 1.9326923076923076923, 3.2947043628013777268,
1.9406550236091174815, 3.2891322170484415006, 1.9395762959454179945,
3.2898824950767712560, 1.9397202098338394193, 3.2897823169897008774,
1.9397009700462680494, 3.2897957082771393366, 1.9397035414896067778,
3.2897939184733157845, 1.9397031977973028763, 3.2897941576932808440,
1.9397032437340771685, 3.2897941257199246907, 1.9397032375943160764,…}
A=10:
⟨x(t)⟩ = {2.0000000000000000000, 3.5000000000000000000,
2.0357142857142857143, 3.4739974937343358396, 2.0299918030489697054,
3.4780600343402883829, 2.0308581890541891107, 3.4774424576209494977,
2.0307258002453643366, 3.4775367688920996555, 2.0307460018232384149,

3.4775223763189398056, 2.0307429185506403926, 3.4775245729587328019,
2.0307433891208428148, 3.4775242377060224374, 2.0307433173018880913,
3.4775242888726518943, 2.0307433282629696081, 3.4775242810635487518,…}
⟨y(t)⟩ = {4.0000000000000000000, 2.0000000000000000000,
3.5000000000000000000, 2.0357142857142857143, 3.4739974937343358396,
2.0299918030489697054, 3.4780600343402883829, 2.0308581890541891107,
3.4774424576209494977, 2.0307258002453643366, 3.4775367688920996555,
2.0307460018232384149, 3.4775223763189398056, 2.0307429185506403926,
3.4775245729587328019, 2.0307433891208428148, 3.4775242377060224374,
2.0307433173018880913, 3.4775242888726518943, 2.0307433282629696081,…}
A=11:
⟨x(t)⟩ = {2.0000000000000000000, 3.7500000000000000000,
2.1416666666666666667, 3.6389267185473411154, 2.1137351092034987147,
3.6588965297804411770, 2.1182969781565584701, 3.6555738518649260550,
2.1175221445323948759, 3.6561365066631520267, 2.1176529201886943890,
3.6560414935710890281, 2.1176308242302957837, 3.6560575456674436377,
2.1176345569029253450, 3.6560548339453806628, 2.1176339263227852671,
3.6560552920498058674, 2.1176340328494730191, 3.6560552146601699617,…}
⟨y(t)⟩ = {4.0000000000000000000, 2.0000000000000000000,
3.7500000000000000000, 2.1416666666666666667, 3.6389267185473411154,
2.1137351092034987147, 3.6588965297804411770, 2.1182969781565584701,
3.6555738518649260550, 2.1175221445323948759, 3.6561365066631520267,
2.1176529201886943890, 3.6560414935710890281, 2.1176308242302957837,
3.6560575456674436377, 2.1176345569029253450, 3.6560548339453806628,
2.1176339263227852671, 3.6560552920498058674, 2.1176340328494730191,…}
A=12:
⟨x(t)⟩ = {2.0000000000000000000, 4.0000000000000000000,
2.2500000000000000000, 3.7916666666666666667, 2.1925366300366300366,
3.8328246478991754130, 2.2024333177926519736, 3.8254762092437521426,
2.2006020459098608359, 3.8268276165077598368, 2.2009368255459495953,
3.8265802803917467854, 2.2008754858926620049, 3.8266255888554945968,
2.2008867201735009911, 3.8266172903501881891, 2.2008846624741861526,
3.8266188103147980869, 2.2008850393624075159, 3.8266185319177126379,…}
⟨y(t)⟩ = {4.0000000000000000000, 2.0000000000000000000,
4.0000000000000000000, 2.2500000000000000000, 3.7916666666666666667,
2.1925366300366300366, 3.8328246478991754130, 2.2024333177926519736,
3.8254762092437521426, 2.2006020459098608359, 3.8268276165077598368,
2.2009368255459495953, 3.8265802803917467854, 2.2008754858926620049,
3.8266255888554945968, 2.2008867201735009911, 3.8266172903501881891,
2.2008846624741861526, 3.8266188103147980869, 2.2008850393624075159,…}

Interpretieren Sie
$x(\infty)=\text{flipflop}(\alpha,\beta)$.

Nun naheliegend:
Input Startwert x(0)=a
„Radikanden“ A, B positiv, reell
Rekursion

$$x(t+1)=\frac{1}{2}\left(x(t)+\frac{\text{flipflop(A,B)}}{x(t)}\right) \qquad (3)$$

Beispiele

a=2

A=5, B=5:

⟨x(t)⟩ = {2.0000000000000000000, 2.2500000000000000000,
2.2361111111111111111, 2.2360679779158040028, 2.2360679774997896964,
2.2360679774997896964, 2.2360679774997896964, 2.2360679774997896964,
2.2360679774997896964, 2.2360679774997896964, 2.2360679774997896964,
2.2360679774997896964, 2.2360679774997896964, 2.2360679774997896964,
2.2360679774997896964, 2.2360679774997896964, 2.2360679774997896964,…}

A=6, B=5:

⟨x(t)⟩ = {2.0000000000000000000, 2.5000000000000000000,
2.2500000000000000000, 2.4583333333333333333, 2.2461158192090395480,
2.4586969600682833332, 2.2461472318130390513, 2.4586939873184452296,
2.2461469748258926647, 2.4586940116364519337, 2.2461469769281143914,
2.4586940114375241694, 2.2461469769109176576, 2.4586940114391514515,
2.2461469769110583314, 2.4586940114391381399, 2.2461469769110571807,
2.4586940114391382488, 2.2461469769110571901, 2.4586940114391382479,…}

A=7, B=5:

⟨x(t)⟩ = {2.0000000000000000000, 2.7500000000000000000,
2.2840909090909090909, 2.6743837630031659882, 2.2719866684668822785,
2.6764953312639830973, 2.2723049646669079900, 2.6764386914572619119,
2.2722964116369873581, 2.6764402126515993376, 2.2722966413376553151,
2.6764401717977455873, 2.2722966351687068379, 2.6764401728949353631,
2.2722966353343829332, 2.6764401728654687336, 2.2722966353299334603,
2.6764401728662601028, 2.2722966353300529574, 2.6764401728662388494,…}

A=8, B=5:

⟨x(t)⟩ = {2.0000000000000000000, 3.0000000000000000000,
2.3333333333333333333, 2.8809523809523809524, 2.3082447855175127902,
2.8870408531824382501, 2.3094589869147434712, 2.8867368694981504744,
2.3093981814902864019, 2.8867520697679053121, 2.3094012215225128028,
2.8867513097571331922, 2.3094010695203040681, 2.8867513477576785870,
2.3094010771204130113, 2.8867513458576513343, 2.3094010767404075604,
2.8867513459526526970, 2.3094010767594078329, 2.8867513459479026288,…}

A=5, B=6:

⟨x(t)⟩ = {2.0000000000000000000, 2.2500000000000000000,
2.4583333333333333333, 2.2461158192090395480, 2.4586969600682833332,
2.2461472318130390513, 2.4586939873184452296, 2.2461469748258926647,
2.4586940116364519337, 2.2461469769281143914, 2.4586940114375241694,
2.2461469769109176576, 2.4586940114391514515, 2.2461469769110583314,
2.4586940114391381399, 2.2461469769110571807, 2.4586940114391382488,
2.2461469769110571901, 2.4586940114391382479, 2.2461469769110571900,…}

A=6, B=6:

⟨x(t)⟩ = {2.0000000000000000000, 2.5000000000000000000,
2.4500000000000000000, 2.4494897959183673469, 2.4494897427831786745,
2.4494897427831780982, 2.4494897427831780982, 2.4494897427831780982,
2.4494897427831780982, 2.4494897427831780982, 2.4494897427831780982,
2.4494897427831780982, 2.4494897427831780982, 2.4494897427831780982,
2.4494897427831780982, 2.4494897427831780982, 2.4494897427831780982,…}

A=7, B=6:

⟨x(t)⟩ = {2.0000000000000000000, 2.7500000000000000000,
2.4659090909090909091, 2.6523093841642228739, 2.4572444578204847353,
2.6529819375508770595, 2.4572939936801145222, 2.6529779922364602855,
2.4572937026702811770, 2.6529780154107394079, 2.4572937043796216195,
2.6529780152746176624, 2.4572937043695812460, 2.6529780152754172183,
2.4572937043696402215, 2.6529780152754125218, 2.4572937043696398751,
2.6529780152754125494, 2.4572937043696398771, 2.6529780152754125493,…}

A=8, B=6:

⟨x(t)⟩ = {2.0000000000000000000, 3.0000000000000000000,
2.5000000000000000000, 2.8500000000000000000, 2.4776315789473684211,
2.8532608239930681723, 2.4780590002184737716, 2.8531960714650225798,
2.4780504858473743806, 2.8531973604187800725, 2.4780506553225567138,
2.8531973347622946119, 2.4780506519491673101, 2.8531973352729846730,
2.4780506520163143245, 2.8531973352628194330, 2.4780506520149777692,

2.8531973352630217712, 2.4780506520150043732, 2.8531973352630177437,…}

Interpretieren Sie
x(∞)=flipflop(α, β) .

Sapere aude

Y.Weiss, R.Kaenders. Die Kompetenzfalle.
Spektrum der Wissenschaft 9.18, S. 80-85
spektrum.de/artikel/1580894

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