Unit n°117

e, fib(i), Φ, and more

117.1 Launch pad

$e = 2.7182818284\ldots$

$= [2;1,1,2,1,1,4,1,1,6,1,1,8,1,1,\ldots]$

$\langle fib(i)\rangle_{i=0}^{\infty} = 1,1,2,3,5,8,13,21,34,55,89,144,233,...$

$fib(i+2) = fib(i+1) + fib(i)\ ;\ fib(0) = fib(1) = 1$

$$\Phi = \lim_{i\to\infty}\frac{fib(i+1)}{fib(i)} = \frac{1}{2}(1+\sqrt{5}) = [1;1,1,1,1,1,1,1,...$$

$$\frac{e*fib(i+2)-fib(i+1)}{e*fib(i+1)-fib(i)} =$$

$$[\underbrace{1;1,1,1,...,1}_{i\text{ times}},\underbrace{2,1,1,2,1,1,4,1,1,6,1,1,8,1,1,...}_{\hat{=}\ scf\left(\frac{efib(2)-fib(1)}{efib(1)-fib(0)}=\frac{2e-1}{e-1}\right)}]$$

Discuss

$$\lim_{i\to\infty}\frac{e*fib(i+2)-fib(i+1)}{e*fib(i+1)-fib(i)} =$$

$$\lim_{i\to\infty}[\underbrace{1;1,1,1,...,1}_{i\text{ times}},\underbrace{2,1,1,2,1,1,4,1,1,6,1,1,8,1,1,...}_{\hat{=}\ scf\left(\frac{efib(2)-fib(1)}{efib(1)-fib(0)}=\frac{2e-1}{e-1}\right)}]$$

The infscf consist of two (concatenated) infscf, for Φ and for e.

117.2 Go to $\sqrt{e}$

$$\frac{\sqrt{e}*fib(i+2)-fib(i+1)}{\sqrt{e}*fib(i+1)-fib(i)}=$$

$$[\underbrace{1;1,1,1,\ldots,1}_{\text{i times}},\underbrace{3,1,1,5,1,1,9,1,1,13,1,1,17,1,1,\ldots}_{\triangleq \text{scf}\left(\frac{\sqrt{e}fib(2)-fib(1)}{\sqrt{e}fib(1)-fib(0)}=\frac{2\sqrt{e}-1}{\sqrt{e}-1}\right)}]$$

117.3 Go to e^2

$$\frac{e^2*fib(i+2)-fib(i+1)}{e^2*fib(i+1)-fib(i)}=$$

$$[\underbrace{1;1,1,1,\ldots,1}_{\text{i times}},$$

$$\underbrace{2,6,2,1,1,3,18,5,1,1,6,30,8,1,1,9,42,11,1,1,\ldots}_{\triangleq \text{scf}\left(\frac{e^2fib(2)-fib(1)}{e^2fib(1)-fib(0)}=\frac{2e^2-1}{e^2-1}\right)}]$$

117.4 Goto $\sqrt[n]{e}$

$$\frac{\sqrt[n]{e}*fib(i+2)-fib(i+1)}{\sqrt[n]{e}*fib(i+1)-fib(i)}=$$

$$[\underbrace{1;1,1,1,\ldots,1}_{\text{i times}},$$

$$\underbrace{n+1,1,1,3n-1,1,1,5n-1,1,1,7n-1,1,1,9n-1,1,1,\ldots}_{\triangleq \text{scf}\left(\frac{\sqrt[n]{e}fib(2)-fib(1)}{\sqrt[n]{e}fib(1)-fib(0)}=\frac{2\sqrt[n]{e}-1}{\sqrt[n]{e}-1}\right)}]$$

117.5 Extension 1 → Conjecture 1

$$\operatorname{scf}\left(\frac{e^{k}*\operatorname{fib}(i+2)-\operatorname{fib}(i+1)}{e^{k}*\operatorname{fib}(i+1)-\operatorname{fib}(i)}\right)=$$

$$[\underbrace{1;1,1,1,\ldots,1}_{\text{i times}},\operatorname{scf}\left(\frac{e^{k}\operatorname{fib}(2)-\operatorname{fib}(1)}{e^{k}\operatorname{fib}(1)-\operatorname{fib}(0)}\right)]$$

117.6 Extension 2 → Conjecture 2
Visitor's turn

117.7 Veri/falsification of conjecture 1

117.8
Gcf with head clusters
117.8.1

$$\underbrace{\frac{1|}{|2}+\frac{1|}{|2}+\frac{1|}{|2}+\ldots\frac{1|}{|2}}_{\text{(i-1) times}}+\underbrace{\frac{1|}{|2}+\frac{2|}{|3}+\frac{3|}{|4}+\frac{4|}{|5}+\frac{5|}{|6}+\frac{6|}{|7}+\ldots}_{\triangleq\ \operatorname{gcf}\left(\frac{a(1)e+b(1)}{c(1)e+d(1)}=\frac{3-e}{e-2}\right)}=$$

$$\operatorname{gcf}\left(\frac{a(i)e+b(i)}{c(i)e+d(i)}\right);$$

$$\begin{pmatrix} a(i+1) & b(i+1) \\ c(i+1) & d(i+1) \end{pmatrix} = \begin{pmatrix} 0 & 1 \\ 1 & 2 \end{pmatrix}^{i} \begin{pmatrix} -1 & 3 \\ 1 & -2 \end{pmatrix}$$

$$= \begin{pmatrix} 0 & 1 \\ 1 & 2 \end{pmatrix} \begin{pmatrix} a(i) & b(i) \\ c(i) & d(i) \end{pmatrix};$$

$$\begin{pmatrix} a(1) & b(1) \\ c(1) & d(1) \end{pmatrix} = \begin{pmatrix} -1 & 3 \\ 1 & -2 \end{pmatrix}$$

$$\det \begin{pmatrix} a(i) & b(i) \\ c(i) & d(i) \end{pmatrix} = (-1)^{i}$$

$$A(i) = \frac{a(i)e + b(i)}{c(i)e + d(i)}$$

$$A(1) = \frac{1}{e-2} - 1 = 0.392211191...$$

$$A(\infty) = \sqrt{2} - 1 \quad = 0.414213562...$$

And intermediate?

$$\lim_{i\to\infty} \frac{a(i)}{c(i)} = \lim_{i\to\infty} \frac{b(i)}{d(i)} = 0.414213562... = \sqrt{2} - 1$$

$$\lim_{i\to\infty} \frac{a(i)}{d(i)} = -\ 0.320377241... = \frac{1}{7}(1 - 3\sqrt{2})$$

$$\lim_{i\to\infty} \frac{b(i)}{c(i)} = -\ 0.535533905... = \frac{1}{2}(6 - 5\sqrt{2})$$

$$\underbrace{\frac{1}{|2}+\frac{1}{|2}+\frac{1}{|2}+\ldots\frac{1}{|2}}_{\text{(i-1) times}}+\underbrace{\frac{1}{|2}+\frac{2}{|3}+\frac{3}{|4}+\frac{4}{|5}+\frac{5}{|6}+\frac{6}{|7}+\ldots}_{\triangleq \operatorname{gcf}\left(\frac{a(1)e+b(1)}{c(1)e+d(1)}=\frac{3-e}{e-2}\right)}=$$

$$[0;\underbrace{2,2,2,\ldots,2}_{\text{(i-1) times}},\underbrace{2,1,1,4,1,1,6,1,1,8,\ldots}_{\triangleq \operatorname{scf}\left(\frac{e-2}{3-e}\right)}]$$

$$\underbrace{\frac{1}{|2}+\frac{1}{|2}+\frac{1}{|2}+\ldots\frac{1}{|2}}_{\text{(i-1) times}}+\underbrace{\frac{1}{|2}+\frac{2}{|3}+\frac{3}{|4}+\frac{4}{|5}+\frac{5}{|6}+\frac{6}{|7}+\ldots}_{\triangleq \operatorname{gcf}\left(\frac{3-e}{e-2}\right)}=$$

$$2[0;\underbrace{5,10,14,18,22,26,30,\ldots}_{\triangleq \operatorname{scf}\left(2\frac{e-2}{3-e}\right)}] \qquad \text{for i=1}$$

$$\frac{1}{2}[0;1,5,10,14,18,22,26,30,\ldots] \qquad \text{for i=2}$$

$$2[0;4,1,5,10,14,18,22,26,30,\ldots] \qquad \text{for i=3}$$

$$\frac{1}{2}[0;1,4,1,5,10,14,18,22,26,30,\ldots] \qquad \text{for i=4}$$

$$2[0;4,1,4,1,5,10,14,18,22,26,30,\ldots] \qquad \text{for i=5}$$

$$\frac{1}{2}[0;1,4,1,4,1,5,10,14,18,22,26,30,\ldots] \qquad \text{for i=6}$$

117.8.2

$$\underbrace{\frac{2|}{|3}+\frac{2}{|3}+\frac{2|}{|3}+\ldots\frac{2|}{|3}}_{\text{(i-1) times}}+\underbrace{\frac{2|}{|3}+\frac{4|}{|5}+\frac{6|}{|7}+\frac{8|}{|9}+\frac{10|}{|11}+\frac{12|}{|13}+\ldots}_{\triangleq \operatorname{gcf}\left(\frac{a(1)\sqrt{e}+b(1)}{c(1)\sqrt{e}+d(1)}=\frac{2-\sqrt{e}}{\sqrt{e}-1}\right)}=$$

$$\operatorname{gcf}\left(\frac{a(i)\sqrt{e}+b(i)}{c(i)\sqrt{e}+d(i)}\right);$$

$$\begin{pmatrix} a(i+1) & b(i+1) \\ c(i+1) & d(i+1) \end{pmatrix}=\begin{pmatrix} 0 & 2 \\ 1 & 3 \end{pmatrix}^{i}\begin{pmatrix} -1 & 2 \\ 1 & -1 \end{pmatrix}$$

$$=\begin{pmatrix} 0 & 2 \\ 1 & 3 \end{pmatrix}\begin{pmatrix} a(i) & b(i) \\ c(i) & d(i) \end{pmatrix};$$

$$\begin{pmatrix} a(1) & b(1) \\ c(1) & d(1) \end{pmatrix}=\begin{pmatrix} -1 & 2 \\ 1 & -1 \end{pmatrix}$$

$$\det\begin{pmatrix} a(i) & b(i) \\ c(i) & d(i) \end{pmatrix}=\frac{1}{2}(-2)^{i}$$

$$B(i)=\frac{a(i)\sqrt{e}+b(i)}{c(i)\sqrt{e}+d(i)}$$

$$B(1)=\frac{1}{\sqrt{e}-1}-1=0.541494082...$$

$$B(\infty)=\frac{\sqrt{17}-3}{2}=0.561552812...$$

And intermediate?

$$\lim_{i\to\infty}\frac{a(i)}{c(i)}=\lim_{i\to\infty}\frac{b(i)}{d(i)}=0.561552812...$$

$$=\frac{1}{2}(\sqrt{17}-3)$$

$$\lim_{i\to\infty}\frac{a(i)}{d(i)}=-\,0.921164609...$$

$$=-[0;1,11,1,2,5,1,5,2,1,...]$$

$$\lim_{i\to\infty}\frac{b(i)}{c(i)}=-\,0.342329219...$$

$$=-[0;2,1,11,1,2,5,1,5,2,1,...]$$

$$\underbrace{\frac{2|}{|3}+\frac{2|}{|3}+\frac{2|}{|3}+...\frac{2|}{|3}}_{\text{(i-1) times}}+\underbrace{\frac{2|}{|3}+\frac{4|}{|5}+\frac{6|}{|7}+\frac{8|}{|9}+\frac{10|}{|11}+\frac{12|}{|13}+...}_{\triangleq\ \mathrm{gcf}\left(\frac{a(1)\sqrt{e}+b(1)}{c(1)\sqrt{e}+d(1)}=\frac{2-\sqrt{e}}{\sqrt{e}-1}\right)}=$$

$$\frac{2-\sqrt{e}}{\sqrt{e}-1} = [0;1,1,5,1,1,9,1,1,13,1,1,\ldots]$$

$$= \frac{1}{2}[1;12,20,28,36,42,50,\ldots] \quad \text{for i=1}$$

$$2\frac{\sqrt{e}-1}{2\sqrt{e}-1} = 2[0;3,1,1,5,1,1,9,1,1,13,1,1,\ldots]$$

$$= 4[0;7,12,20,28,36,42,50,\ldots] \quad \text{for i=2}$$

Find more:

$$2\frac{2\sqrt{e}-1}{8\sqrt{e}-5} = 0.561051774\ldots = ? \quad \text{for i=3}$$

$$2\frac{8\sqrt{e}-5}{28\sqrt{e}-17} = 0.561631823\ldots = ? \quad \text{for i=4}$$

117.9
Gcf with inbetween clusters
117.9.1

$$\frac{1|}{|2}+\frac{2|}{|3}+\frac{3|}{|4}+\frac{4|}{|5}+\frac{5|}{|6}+\frac{6|}{|7}+\ldots$$

$$=0.392211191\ldots=[0;2,1,1,4,1,1,6,1,1,8,1,1,\ldots]$$

$$=\frac{3-e}{e-2}$$

$$\frac{1|}{|1}+\frac{1|}{|2}+\frac{2|}{|2}+\frac{2|}{|3}+\frac{3|}{|3}+\frac{3|}{|4}+\frac{4|}{|4}+\frac{4|}{|5}+\frac{5|}{|5}+\frac{5|}{|6}+\frac{6|}{|6}+\ldots$$

$$=0.736351302250085608098226180789054\ldots$$

$$=[0;1,2,1,3,1,4,1,5,1,6,1,\ldots]$$

$$=[-1;-2,1,-2,3,-4,5,-6,\ldots]$$

$$=\frac{3-\alpha}{\alpha-2}=\frac{1}{\alpha-2}-1\ ;\ \alpha=\frac{J_1(2)}{J_0(2)}=2.575920322\ldots^{1)}$$

$$\frac{1|}{|1}+\frac{1|}{|1}+\frac{1|}{|2}+\frac{2|}{|2}+\frac{2|}{|2}+\frac{2|}{|3}+\frac{3|}{|3}+\frac{3|}{|3}+\frac{3|}{|4}+\frac{4|}{|4}+\frac{4|}{|4}+\frac{4|}{|5}+\frac{5|}{|5}+\frac{5|}{|5}+\frac{5|}{|6}+\ldots=$$

$$\left(\frac{1|}{|1}+\right)^2\frac{1|}{|2}+\left(\frac{2|}{|2}+\right)^2\frac{2|}{|3}+\left(\frac{3|}{|3}+\right)^2\frac{3|}{|4}+\left(\frac{4|}{|4}+\right)^2\frac{4|}{|5}+\left(\frac{5|}{|5}+\right)^2\frac{5|}{|6}+\ldots=$$

$$0.577721798107429313771771389542459861\ldots=???$$

$$\frac{1}{|1}+\frac{1}{|1}+\frac{1}{|1}+\frac{1}{|2}+\frac{2}{|2}+\frac{2}{|2}+\frac{2}{|2}+\frac{2}{|3}+\frac{3}{|3}+\frac{3}{|3}+\frac{3}{|3}+\frac{3}{|4}+\frac{4}{|4}+\frac{4}{|4}+\frac{4}{|4}+\frac{4}{|5}+\ldots=$$

$$\left(\frac{1}{|1}+\right)^{\overline{3}}\frac{1}{|2}+\left(\frac{2}{|2}+\right)^{\overline{3}}\frac{2}{|3}+\left(\frac{3}{|3}+\right)^{\overline{3}}\frac{3}{|4}+\left(\frac{4}{|4}+\right)^{\overline{3}}\frac{4}{|5}+\left(\frac{5}{|5}+\right)^{\overline{3}}\frac{5}{|6}+\left(\frac{6}{|6}+\right)^{\overline{3}}\frac{6}{|7}+\ldots=$$

0.6340148638074410344489558054941065161217385 68…=
[0; 1, 1, 1, 2, 1, 2, 1, 3, 1, 3, 1, 4, 1, 4, 1, 5, 1, 5, 1, 6, 1, 6, 1, 7,
1, 7, 1, 8, 1, 8, 1, 9, 1, 9, 1, 10, 1, 10, 1, 11, 1, 11, 1, 12, 1, 12,
1, 13, 1, 13, 1, 14, 1, 14, 1, 15, 1, 15, 1, 16, 1, 16, 1, 17, 1, 17,
1, 18, 1, 18, 1, 19, 1, 19, 1, 20, 1, 20, 1, 21, 1, 21, 1, 22, 1, 22,
1, 23, 1, 23, 1, 24, 1, 24, 1, 25, 1, 25, 1, 26, 1, 26, 1, …] =
formula expression???

$$\left(\frac{1}{|1}+\right)^{\overline{5}}\frac{1}{|2}+\left(\frac{2}{|2}+\right)^{\overline{5}}\frac{2}{|3}+\left(\frac{3}{|3}+\right)^{\overline{5}}\frac{3}{|4}+\left(\frac{4}{|4}+\right)^{\overline{5}}\frac{4}{|5}+\left(\frac{5}{|5}+\right)^{\overline{5}}\frac{5}{|6}+\left(\frac{6}{|6}+\right)^{\overline{5}}\frac{6}{|7}+\ldots=$$

0.6203460333218974188770448863875056669076402 1…=
[0; 1, 1, 1, 1, 1, 2, 1, 2, 1, 2, 1, 3, 1, 3, 1, 3, 1, 4, 1, 4, 1, 4,
1, 5, 1, 5, 1, 5, 1, 6, 1, 6, 1, 6, 1, 7, 1, 7, 1, 7, 1, 8, 1, 8, 1, 8,
1, 9, 1, 9, 1, 9, 1, 10, 1, 10, 1, 10, 1, 11, 1, 11, 1, 11, …] =
$[0; (1,)^{\overline{3}}\ (1, 2,)^{\overline{3}}\ (1, 3,)^{\overline{3}}\ (1, 4,)^{\overline{3}}\ (1, 5,)^{\overline{3}}\ (1, 6,)^{\overline{3}}\ (1, 4,)^{\overline{3}}\ \ldots]$
formula expression???

Generalization

$$\left(\frac{1}{|1}+\right)^{\overline{2k-1}}\frac{1}{|2}+\left(\frac{2}{|2}+\right)^{\overline{2k-1}}\frac{2}{|3}+\left(\frac{3}{|3}+\right)^{\overline{2k-1}}\frac{3}{|4}+\left(\frac{4}{|4}+\right)^{\overline{2k-1}}\frac{4}{|5}+\left(\frac{5}{|5}+\right)^{\overline{2k-1}}\frac{5}{|6}+\ldots=$$

$[0; (1,)^{\overline{2k-2}}\ (1, 2,)^{\overline{k}}\ (1, 3,)^{\overline{k}}\ (1, 4,)^{\overline{k}}\ (1, 5,)^{\overline{k}}\ (1, 6,)^{\overline{k}}\ (1, 4,)^{\overline{k}}\ \ldots] =$
formula expression???
How about $\overline{exp} = \overline{2k}$?

117.9.2

$$\frac{1|}{|2}+\frac{2|}{|3}+\frac{3|}{|4}+\frac{4|}{|5}+\frac{5|}{|6}+\frac{6|}{|7}+\ldots$$

$$=0.392211191\ldots=[0;2,1,1,4,1,1,6,1,1,8,1,1,\ldots]$$

$$=\frac{3-e}{e-2}$$

$$\frac{1|}{|2}+\frac{1|}{|2}+\frac{2|}{|3}+\frac{2|}{|3}+\frac{3|}{|4}+\frac{3|}{|4}+\frac{4|}{|5}+\frac{4|}{|5}+\frac{5|}{|6}+\frac{5|}{|6}+\frac{6|}{|7}+\frac{6|}{|7}+\ldots$$

$$=\left(\frac{1|}{|2}+\right)^{\underline{2}}\left(\frac{2|}{|3}+\right)^{\underline{2}}\left(\frac{3|}{|4}+\right)^{\underline{2}}\left(\frac{4|}{|5}+\right)^{\underline{2}}\left(\frac{5|}{|6}+\right)^{\underline{2}}\left(\frac{6|}{|7}+\right)^{\underline{2}}\ldots$$

$$=0.418397480588482791543915866889022774\ldots$$

$$g(k)=\left(\frac{1|}{|2}+\right)^{\underline{k}}\left(\frac{2|}{|3}+\right)^{\underline{k}}\left(\frac{3|}{|4}+\right)^{\underline{k}}\left(\frac{4|}{|5}+\right)^{\underline{k}}\left(\frac{5|}{|6}+\right)^{\underline{k}}\left(\frac{6|}{|7}+\right)^{\underline{k}}\ldots$$

$$g(1)=0.392211191\ldots=[0;2,1,1,4,1,1,6,1,1,8,1,1,\ldots]$$

$$=\frac{3-e}{e-2}$$

$$g(2)=0.418397480588482791543915866889022\ldots$$

$$=[0;\ 2,\ 2,\ 1,\ 1,\ 3,\ 2,\ 3,\ 60,\ 4,\ 1,\ 1,\ 1,\ 2,\ 4,\ 1,\ 7,\ 3,\ 2,\ 9,\ 13,\ 1,\ 16,\ 1,\ 1,\ 2,\ 1,\ 38,\ 1,$$
$$1,\ 1,\ 3,\ 14,\ 1,\ 1,\ 3,\ 3,\ 11,\ 1,\ 8,\ 3,\ 1,\ 9,\ 2,\ 2,\ 1,\ 3,\ 6,\ 1,\ 1,\ 1,\ 1,\ 3,\ 1,\ 2,\ 2,\ 1,\ 1,\ 2,$$
$$1,\ 6,\ 1,\ 4,\ 1,\ 1,\ 11,\ 11,\ 3,\ 1,\ 3,\ 1,\ 1,\ 2,\ 38,\ 2,\ 3,\ 1,\ 1,\ 1,\ 4,\ 1,\ 2,\ 2,\ 1,\ 5,\ 1,\ 1,\ 7,$$
$$1,\ 2,\ 3,\ 1,\ 1,\ 5,\ 2,\ 3,\ 4,\ 149,\ 2,\ 17,\ 2,\ 1,\ 2,\ 1,\ 3,\ 1,\ 5,\ 1,\ 4,\ 32,\ 1,\ 1,\ 1,\ 2,\ 1,\ 2,$$
$$11,\ 6,\ 1,\ 3,\ 4,\ 4,\ 1,\ 3,\ 2,\ 3,\ 1,\ 1,\ 1,\ 1,\ 13,\ 1,\ 10,\ 2,\ 1,\ 2,\ 2,\ 2,\ 3,\ 25,\ 4,\ 1,\ 2,\ 2,$$

4, 2, 1, 2, 2, 5, 6, 1, 8, 3, 6, 2, 100, 1, 6, 4, 2, 1, 1, 1, 1, 5, 39, 2, 11, 6, 2, 2,
12, 11, 1, 1, 12, 2, 4, 11, 4, 6, 2, 3, 1, 2, 2, 1, 3, 2, 1, 4, 1, 3, 1, 8, 1, 1, 2, 7, …]

g(101) = 0.4142135623730950488016887242096980785696718753769…

= [0; 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2,
2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2,
2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2,
2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 1, 1, 3, 1, 1, 3, 1, 1, 3, 1, 1, 3, 1, 1, 3, 1, 1, 3, 1,
1, 3, 1, 1, 3, 1, 1, 3, 1, 1, 3, 1, 1, 3, 1, 1, 3, 1, 1, 3, 1, 1, 3, 1, 1, 3, 1, 1, 3, 1,
1, 3, 1, 1, 3, 1, 1, 3, 1, 1, 3, 1, 1, 3, 1, 1, 3, 1, 1, 3, 1, 1, 3, 1, 1, 3, 1, 1, 3,
1, 1, 3, 1, 1, 3, 1, 1, 3, 1, 1, 3, 1, 1, 3, 1, 1, 3, 1, 1, 3, 1, 1, 3, 1, 1, 3, 1, 1,
3, 1, 1, 3, 1, 1, 3, 1, 1, 3, 1, 1, 3, 1, 1, 3, 1, 1, 3, 1, 1, 3, 1, 1, 3, 1, 1, 4, 4,
5, 16, 13, 1, 4, 6, 13, 4, 1, 1, 1, 3, 15, 3, 1, 1, 1, 2, 1, 2, 1, 1, 1, 5, 4, 1, 1595,
12, 1, 112, 1, 31, 3, 1, 44, 3, 2, 3, 2, 1, 2, 1, 29, 1, 21, 1, 3, 11, 1, 3, 10, 2, 7,
1, 1, 2, 1, 1, 3, 1, 78, 1, 7, 1, 6, 1, 4, 1, 4, 84, 2, 3, 50, 1, 2, 8, 2, 9, 6, 3, 1,
20, 17, 15, 3, 1, 4, 2, 3, 1, 1, 2, 15, 3, 11, 1, 67, 1, 1, 18, 1, 1, 4, 2, 2, 1, 16, 7,
10, 14, 1, 2, 1, 1, 27, 1, 11, 2, 114, 45, 2, 2, 2, 1, 4, 2, 1, 1, 1, 3, 8, 4, 10, 1,
6, 8, 53, 1, 1, 2, 1, 2, 1, 1, 6, 1, 30, 2, 9, 1, 1, 1, 1, 22, 4, 4, 2, 1, 5, 3, 23, …]

$g(\infty) = \sqrt{2} - 1 = [0;2,2,2,2,\ldots]$

And intermediate? “Transformation” of the transcendent number g(1) into the quadratic irrationality g(∞). g(101) shows an interstage of this process. Find out more about it.

Analysieren Sie systematisch die „Zwischenwelt” g(1) → g(∞) mit steigendem k

** bei Ausschluss der Einflussnahme der Rechengenauigkeit

** und mit ein- und zweidimensionaler [5] Darstellung der Elementesequenz von scf(g(k)).

117.9.3

Sandbox, more, more

$$h(k) = \left(\frac{2|}{|3} + \right)^{\underline{k}} \left(\frac{4|}{|5} + \right)^{\underline{k}} \left(\frac{6|}{|7} + \right)^{\underline{k}} \left(\frac{8|}{|9} + \right)^{\underline{k}} \left(\frac{10|}{|11} + \right)^{\underline{k}} \ldots$$

$$h(1) = [0;1,1,5,1,1,9,1,1,13,1,1,17,1,1,\ldots]$$

$$= \frac{1}{2}[1;12,20,28,36,44,52,60,\ldots]$$

$$= \frac{2-\sqrt{e}}{\sqrt{e}-1}$$

$$h(2) =$$

$$h(\infty) =$$

Analysieren Sie auch hier und für weitere Fälle die „Zwischenwelt" $h(1) \rightarrow h(\infty)$ mit steigendem k

** bei Ausschluss der Einflussnahme der Rechengenauigkeit

** und mit ein- und zweidimensionaler [5] Darstellung der Elementesequenz von scf(h(k)).

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1) Bessel functions [2,3,4]

$$\left.\begin{matrix} J_n(x) \\ I_n(x) \end{matrix}\right\} = \sum_{i=0}^{\infty} (\mp 1)^i \frac{\left(\frac{x}{2}\right)^{2i+n}}{i!(i+n)!}$$

$$\left.\begin{matrix} \frac{J_1(x)}{J_0(x)} \\ \frac{I_1(x)}{I_0(x)} \end{matrix}\right\} = \cfrac{1}{\frac{2}{x} \mp \cfrac{1}{\frac{4}{x} \mp \cfrac{1}{\frac{6}{x} \mp \cfrac{1}{\frac{8}{x} \mp \cfrac{1}{\frac{10}{x} \mp \cfrac{1}{\frac{12}{x} \mp \ldots}}}}}} =$$

$$[0; \frac{2}{x}, \mp\frac{4}{x}, \frac{6}{x}, \mp\frac{8}{x}, \frac{10}{x}, \mp\frac{12}{x}, \ldots] =$$

$$\begin{vmatrix} 0 & \frac{1}{0!1!} & \frac{1}{1!2!} & \frac{1}{2!3!} & \frac{1}{3!4!} & \frac{1}{4!5!} & \frac{1}{5!6!} & \cdots \\ -\left(\frac{x}{2}\right)^1 & \frac{1}{0!0!} & \frac{1}{1!1!} & \frac{1}{2!2!} & \frac{1}{3!3!} & \frac{1}{4!4!} & \frac{1}{5!5!} & \cdots \\ \pm\left(\frac{x}{2}\right)^3 & 0 & \frac{1}{0!0!} & \frac{1}{1!1!} & \frac{1}{2!2!} & \frac{1}{3!3!} & \frac{1}{4!4!} & \cdots \\ -\left(\frac{x}{2}\right)^5 & 0 & 0 & \frac{1}{0!0!} & \frac{1}{1!1!} & \frac{1}{2!2!} & \frac{1}{3!3!} & \cdots \\ \pm\left(\frac{x}{2}\right)^7 & 0 & 0 & 0 & \frac{1}{0!0!} & \frac{1}{1!1!} & \frac{1}{2!2!} & \cdots \\ -\left(\frac{x}{2}\right)^9 & 0 & 0 & 0 & 0 & \frac{1}{0!0!} & \frac{1}{1!1!} & \cdots \\ \pm\left(\frac{x}{2}\right)^{11} & 0 & 0 & 0 & 0 & 0 & \frac{1}{0!0!} & \cdots \\ \vdots & \vdots & \vdots & \vdots & \vdots & \vdots & \ddots & \ddots \end{vmatrix} =$$

$$\left(\frac{x}{2}\right)^1 \pm \frac{1}{2}\left(\frac{x}{2}\right)^3 + \frac{1}{3}\left(\frac{x}{2}\right)^5 \pm \frac{11}{48}\left(\frac{x}{2}\right)^7 + \frac{19}{120}\left(\frac{x}{2}\right)^9$$

$$\pm \frac{473}{4320}\left(\frac{x}{2}\right)^{11} + \frac{229}{3024}\left(\frac{x}{2}\right)^{13} \pm \ldots$$

$$\frac{J_1(2)}{J_0(2)} = 2.575920322...$$

$$= [2;1,1,2,1,3,1,4,1,5,1,6,1,...]$$

$$= [0;1,-2,3,-4,5,-6,...]$$

$$\frac{I_1(2)}{I_0(2)} = 0.697774658...$$

$$= [0;1,2,3,4,5,6,...]$$

$$= 2[0;2,1,6,2,10,3,14,4,18,5,22,6,\ldots]$$

$$\frac{e-1}{e+1} = 0.462117157...$$

$$= [0;2,6,10,14,18,22,\ldots]$$

Entanglement of I and e

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Links

Link to Unit 30.1 ,
Link to Unit 193 ,
Link to Unit ABC .

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To be continued.