Unit n° 15

part 35

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

Wort-Fundstücke, Gehörtes und Gelesenes
Schnellladestation
Effectiveness and Efficiency
Warp etc.
https://en.wikipedia.org/wiki/Warp_drive
https://www.nasa.gov/
https://www.nasa.gov/centers/glenn/technology/warp/warp.html
https://tauzero.aero/
Frac/g/k…
fragil
Fragment

Fraktal
Fraktion
Fraktor
Fraktur
Spontanremission?
Vgl. auch N.S. Rose et al., Science, doi: 10.1126/science.aah7011 !!!
Selbstheilung
http://www.wissenschaft.de/home/-/journal_content/56/12054/6771196
http://www.wissenschaft.de/bdw-inside/-/journal_content/56/12054/925765
?? Selbstheilung in numerischen Algorithmen ?? (Vgl. Unit 1)
Zufallstreffer
Vgl. https://de.wikipedia.org/wiki/Serendipität
https://en.wikipedia.org/wiki/Serendipity
Yang Song et al. High-Selectivity Electrochemical Conversion of CO_2 to Ethanol using a Copper Nanoparticle/N-Doped Graphene Electrode
DOI: 10.1002/slct.201601169

Primes

Gibt es einen signifikanten Unterschied in der relativen Häufigkeit zwischen den
mit den/auf die Ziffern 1, 3, bzw. 7 beginnenden/endenden Primzahlen?

Sonification

** https://en.wikipedia.org/wiki/Sonification
** http://www.msn.com/de-de/nachrichten/wissenundtechnik/das-gras-wachsen-h%c3%b6ren-das-geht-wirklich/ar-AAkR9CE?li=BBqg6Q9&ocid=SKY2DHP

„Das Team um Douglas Cook von der New York Universität hat das Wachsen von Maisstengeln hörbar gemacht. Wenn die Stengel wachsen, kommt es zu winzigen Brüchen.

** R.P. Bywater, J. Middleton. Melody discrimination and protein fold classification. DOI: 10.1016/j.heliyon.2016.e00175 https://www.researchgate.net/publication/309330424_Melody_discrimination_and_protein_fold_classification

“One of the greatest challenges in theoretical biophysics and bioinformatics is the identification of protein folds from sequence data. This can be regarded as a pattern recognition problem. In this paper we report the use of a melody generation software where the inputs are derived from calculations of evolutionary information, secondary structure, flexibility, hydropathy and solvent accessibility from multiple sequence alignment data. The melodies so generated are derived from the sequence, and by inference, of the fold, in ways that give each fold a sound representation that may facilitate analysis,

recognition, or comparison with other sequences.”

** Den numerischen Werteverlauf, Verlauf des Differenzenquotienten etc. einer rekursiven Berechnung hörbar (→ beurteilbar, → Algorithmus verbesserbar) machen.

Infinite nested expressions

1)

Discuss the graph of the function

$$F(x) = \prod_{i=1}^{\infty} f(i,x)$$

$$f(1,x) = \sqrt{x}$$

$$f(2,x) = \sqrt{x+x\sqrt{x}}$$

$$f(3,x) = \sqrt{x+x\sqrt{x+x\sqrt{x}}}$$

$$f(4,x) = \sqrt{x+x\sqrt{x+x\sqrt{x+x\sqrt{x}}}}$$

$$f(i+1,x) = \sqrt{x+xf(i,x)} \; ; \; i=1,2,3,...$$

or after transformation

$$F(x) = \prod_{i=1}^{\infty} f(i,x)$$

$$f(1,x) = \left(x^{1}\right)^{0.5}$$

$$f(2,x) = \left(x^{1} + \left(x^{3}\right)^{0.5}\right)^{0.5}$$

$$f(3,x) = \left(x^{1} + \left(x^{3} + \left(x^{7}\right)^{0.5}\right)^{0.5}\right)^{0.5}$$

$$f(4,x) = \left(x^{1} + \left(x^{3} + \left(x^{7} + \left(x^{15}\right)^{0.5}\right)^{0.5}\right)^{0.5}\right)^{0.5}$$

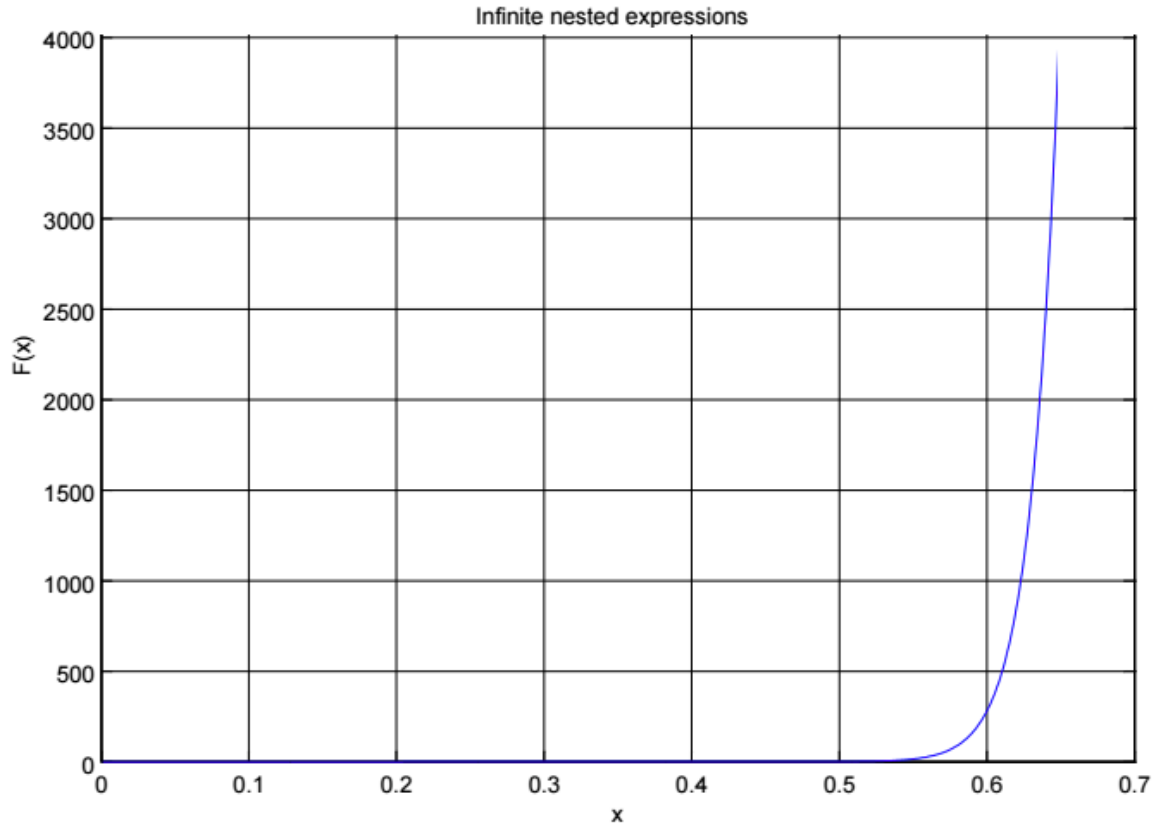
$$f(5,x) = \left(x^{1} + \left(x^{3} + \left(x^{7} + \left(x^{15} + \left(x^{31}\right)^{0.5}\right)^{0.5}\right)^{0.5}\right)^{0.5}\right)^{0.5}$$

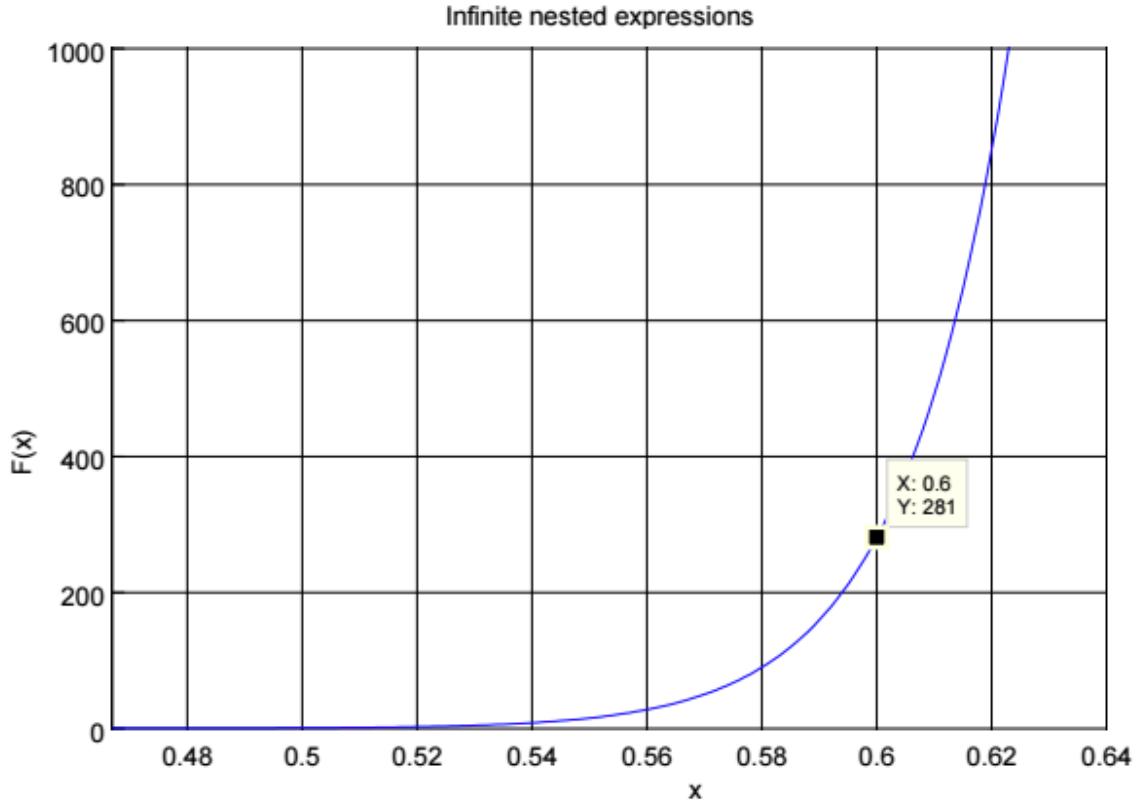
$$\vdots$$

with domain = codomain = $\mathbb{R}$ and $\mathbb{C}$, resp.

$$F\left(\frac{1}{2}\right) = \frac{2}{\pi}$$

Find other special values of F(x).
Find similar infinite nested expression representations for $F'(x)$ and $F''(x)$.


Infinite nested expressions
4000
3500
3000
2500
2000
1500
1000
500
0
F(x)
0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
x


Infinite nested expressions
1000
800
600
400
200
0
F(x)
X: 0.6
Y: 281
0.48
0.5
0.52
0.54
0.56
0.58
0.6
0.62
0.64
x

2)

Discuss the graph of the function

$$F(x) = \prod_{i=0}^{\infty} f(i,x)$$

$$f(0,x) = x$$

$$f(1,x) = x^x$$

$$f(2,x) = \left(x^x\right)^x$$

$$f(3,x) = \left(\left(x^x\right)^x\right)^x$$

$$f(4,x) = \left(\left(\left(x^x\right)^x\right)^x\right)^x$$

$$f(i+1,x) = \left(f(i,x)\right)^x \quad ; i=1,2,3,...$$

with domain = codomain = $\mathbb{R}$ and $\mathbb{C}$, resp.

Find similar infinite nested expression representations for $F'(x)$ and $F''(x)$.

Compare 1) and 2).

04.12.2016 EPS