

Consideration of the Riemann hypothesis

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Abstract

I treat Riemann hypothesis as a series and try to prove it, but I have not shown that non-trivial zeros are only present on the real value $1/2$, but only as close to $1/2$.

The hypothesis could not be proved. Only on the graph and in calculation, only the neighborhood of the real value $1/2$ is shown.

It was also shown that non-trivial zero values deviate only by 0.01 and do not converge clearly to 0.

It has been shown graphically and computationally that non-trivial zeros exist only near real numbers $1/2$ or $1/2$ and can not exist in parts such as real numbers 0.6 or 0.4.

I provide a formula concerned with Riemann-Zeta function wherein non-trivial zero values perfectly match. However, the formula only reaches the pole near the real value of $1/2$.

key words

Riemann-Zeta function, non-trivial zero point, infinite series

1 introduction

$$\zeta(s) = \sum_{n=1}^{\infty} \frac{1}{n^s} \quad s = a + ix \quad (1)$$

Substituting $a=1/2$ and x is non-trivial zero value, for Eq.(1). the value results in zero.

$$\zeta(s) = 2^s \pi^{s-1} \sin\left(\frac{s\pi}{2}\right) \Gamma(1-s) \zeta(1-s) \quad (2)$$

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$$\xi(s) = \frac{1}{2}s(s-1)\pi^{-s/2}\Gamma\left(\frac{1}{2}s\right)\zeta(s) \quad (3)$$

which satisfies:

$$\xi(s) = \xi(1-s) \quad (4)$$

Eq.(4) holds “mirror effect”. ($\Re(s) = 1/2$)

$$\zeta(s) = \sum_{n=1}^{\infty} \frac{1}{n^s} = \sum_{n=1}^{\infty} \frac{1}{n^{a+ix}} = \sum_{n=1}^{\infty} \frac{n^{-x}}{n^a} = \sum_{n=1}^{\infty} \frac{\exp(-ix \ln(n))}{n^a} = \sum_{n=1}^{\infty} \frac{\cos(x \ln(n)) - i \sin(x \ln(n))}{n^a} \quad (5)$$

Riemann Zeta Function is also defined as below.

$$\left(1 - \frac{2}{2^s}\right)\zeta(s) = \sum_{n=1}^{\infty} \frac{(-1)^{n+1}}{n^s} = \sum_{n=1}^{\infty} \frac{1}{(2n-1)^s} - \sum_{n=1}^{\infty} \frac{1}{(2n)^s} = \sum_{n=1}^{\infty} \left[\frac{1}{(2n-1)^s} - \frac{1}{(2n)^s} \right] \quad (6)$$

I define

$$\Re(s) = c, \quad 0 < c < 1, \quad s = c + ix, \quad x \text{ is non-trivial zero value} \quad (7)$$

from $s=c+ix$

$$\frac{1}{(2n-1)^s} = \frac{(2n-1)^{-ix}}{(2n-1)^c} = \frac{\cos(x \ln(2n-1)) - i \sin(x \ln(2n-1))}{(2n-1)^c} \quad (8)$$

$$\frac{1}{(2n)^s} = \frac{(2n)^{-ix}}{(2n)^c} = \frac{\cos(x \ln(2n)) - i \sin(x \ln(2n))}{(2n)^c} \quad (9)$$

$$\zeta(s) = [1/(1-2^{1-s})] \sum_{n=1}^{\infty} \frac{(-1)^{n+1}}{n^s} \quad (10)$$

$$= [1/(1-2^{1-s})] \sum_{n=1}^{\infty} \left[\frac{\cos(x \ln(2n-1)) - i \sin(x \ln(2n-1))}{(2n-1)^c} - \frac{\cos(x \ln(2n)) - i \sin(x \ln(2n))}{(2n)^c} \right] = 0 \quad (11)$$

$$[1/(1-2^{1-s})] \neq 0 \quad (12)$$

$$\sum_{n=1}^{\infty} \left[\frac{\cos(x \ln(2n-1))}{(2n-1)^c} - \frac{\cos(x \ln(2n))}{(2n)^c} \right] = 0 \quad (13)$$

$$\sum_{n=1}^{\infty} \left[\frac{\sin(x \ln(2n-1))}{(2n-1)^c} - \frac{\sin(x \ln(2n))}{(2n)^c} \right] = 0 \quad (14)$$

Although x is treated as a real number, x is a non-trivial zero value.

From Eq.(11), it is estimated that \cos is a real value and \sin is an imaginary value. When this real value and the imaginary value reach zero simultaneously, they become non-trivial zero value.

Eq.(13) and Eq.(14), when $c=1/2$ and x is non-trivial zero value.

From equation Eq.(11), it is estimated that \cos is a real value and \sin is an imaginary value. When real value and imaginary value reach zero simultaneously, it become non-trivial zero value.

2 Examples

In the graph that clearly does not converge to 0, it is often the case that numerical calculations are omitted.

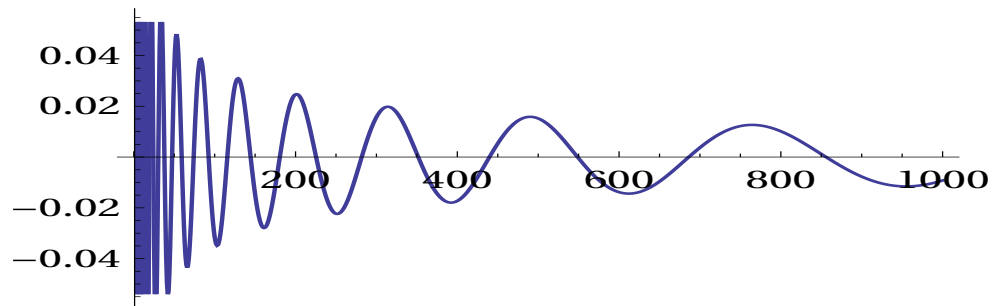
The graph and the first numerical calculation depended on WolframAlpha on the net.

Chapter 1

(14.1347- 0.001)

$$\sum_{n=1}^{1000} \left[\frac{\cos[(14.1337) \ln(2n - 1)]}{(2n - 1)^{0.5}} - \frac{\cos[(14.1337) \ln(2n)]}{(2n)^{0.5}} \right] \quad (15)$$

= -0.009225305555779525779463237679646088942314....



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[10000000]= -0.0001607114065385512091

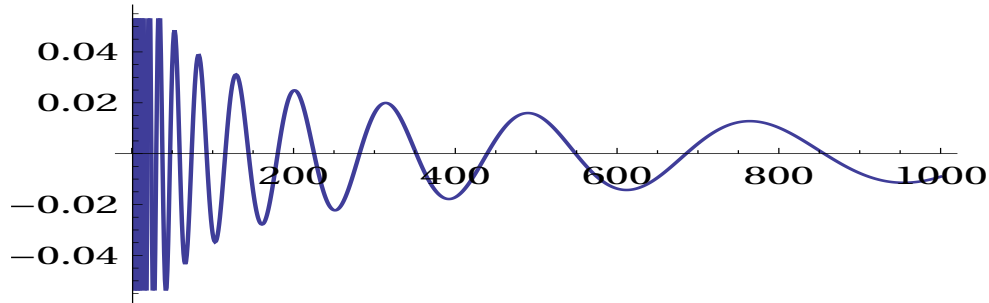
[100000000]= -0.0001509936635404196949

It does not converge to 0.

(14.1347 is non-trivial zero value. as it is.)

$$\sum_{n=1}^{1000} \left[\frac{\cos[(14.1347) \ln(2n-1)]}{(2n-1)^{0.5}} - \frac{\cos[(14.1347) \ln(2n)]}{(2n)^{0.5}} \right] \quad (16)$$

= -0.009063013671335821519956190406232181070163....

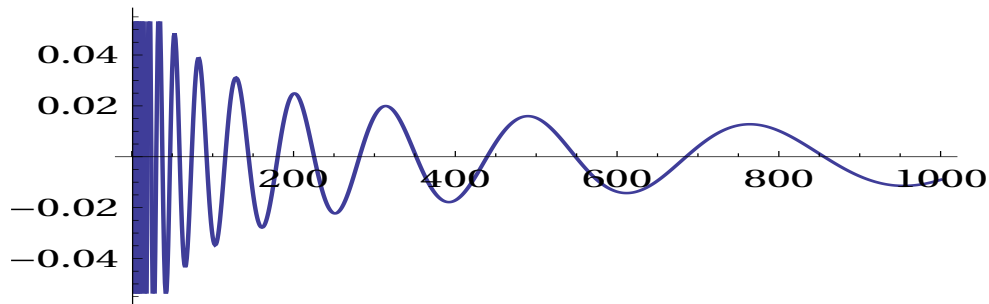


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 [1000000]=0.0002245632899122298001
 [10000000]=-0.0000496479275200912434
 [100000000]=0.0000382288508812898928
 converge to 0.

(14.1347+ 0.01=14.1447)

$$\sum_{n=1}^{1000} \left[\frac{\cos[(14.1447) \ln(2n-1)]}{(2n-1)^{0.5}} - \frac{\cos[(14.1447) \ln(2n)]}{(2n)^{0.5}} \right] \quad (17)$$

= -0.007243403455155722480043192935285864376....

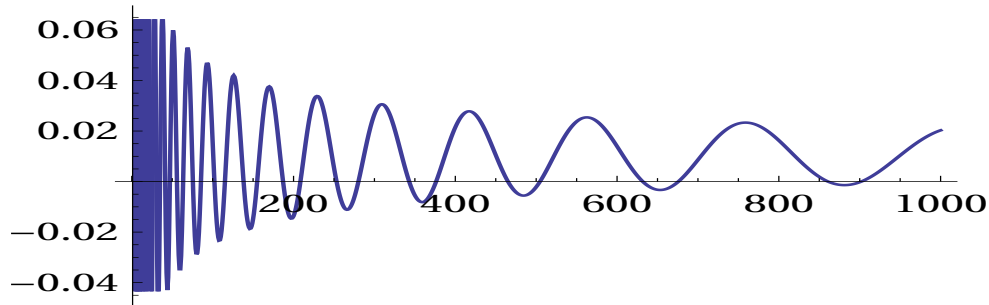


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 [100000000]=0.0012585154544851192247
 It does not converge to 0.

(21.022 - 0.01=21.012)

$$\sum_{n=1}^{1000} \left[\frac{\cos[(21.0120) \ln(2n-1)]}{(2n-1)^{0.5}} - \frac{\cos[(21.0120) \ln(2n)]}{(2n)^{0.5}} \right] \quad (18)$$

= 0.0202848925540409088275801345992109429....

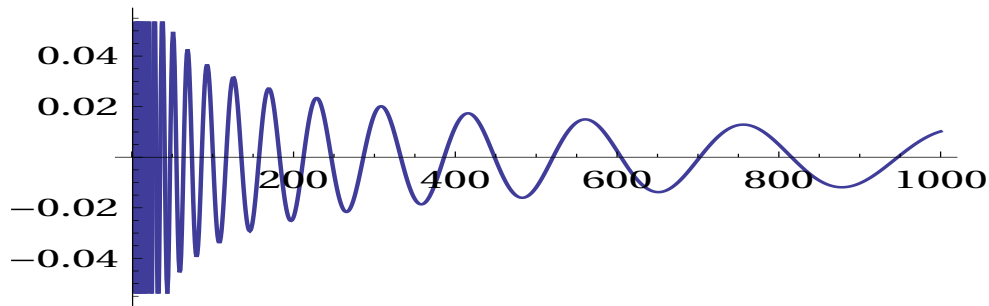


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 [10000000]= 0.0104843503975115531074
 [100000000]=0.0104746550659218524287
 It does not converge to 0.

(21.0220 is non-trivial zero value. as it is.)

$$\sum_{n=1}^{1000} \left[\frac{\cos[(21.0220) \ln(2n-1)]}{(2n-1)^{0.5}} - \frac{\cos[(21.0220) \ln(2n)]}{(2n)^{0.5}} \right] \quad (19)$$

= 0.01020305097297970756165091906533606755457....

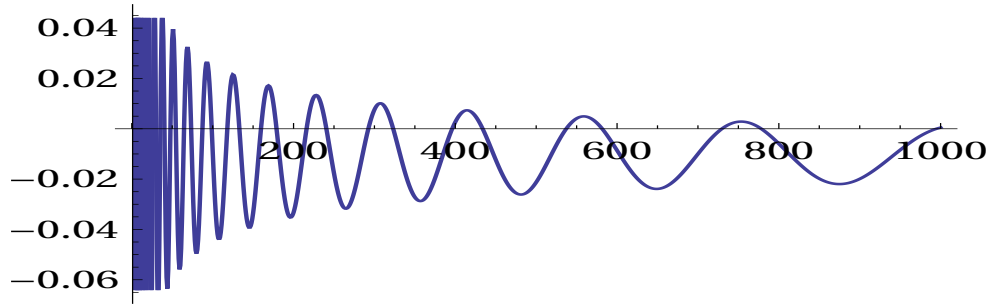


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 [10000000]=0.0000380957809653702473
 [100000000]=0.0000070544092957442871
 converge to 0.

(21.0220+0.01=22.0320)

$$\sum_{n=1}^{1000} \left[\frac{\cos[(21.0320) \ln(2n-1)]}{(2n-1)^{0.5}} - \frac{\cos[(21.0320) \ln(2n)]}{(2n)^{0.5}} \right] \quad (20)$$

= 0.009213501661674673769220937361896999026864....

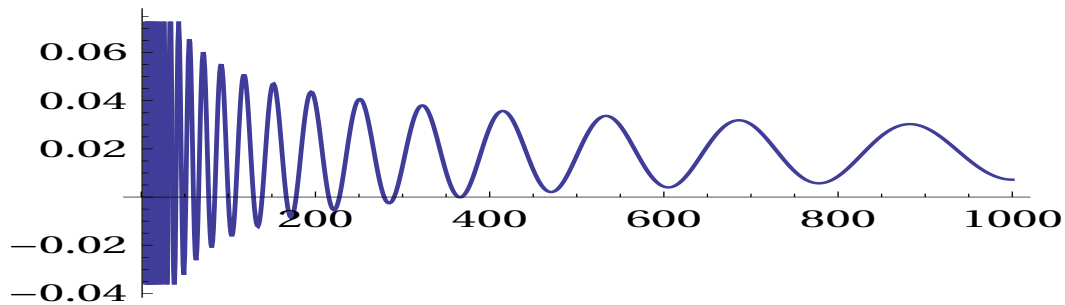


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 [10000000]=-0.0100093633835118597103
 [100000000]=-0.0100605988203420360777
 It does not converge to 0.

(25.0109-0.01=25.0009)

$$\sum_{n=1}^{1000} \left[\frac{\cos[(25.0009) \ln(2n-1)]}{(2n-1)^{0.5}} - \frac{\cos[(25.0009) \ln(2n)]}{(2n)^{0.5}} \right] \quad (21)$$

= 0.007208956867091058558975679870786427234417....

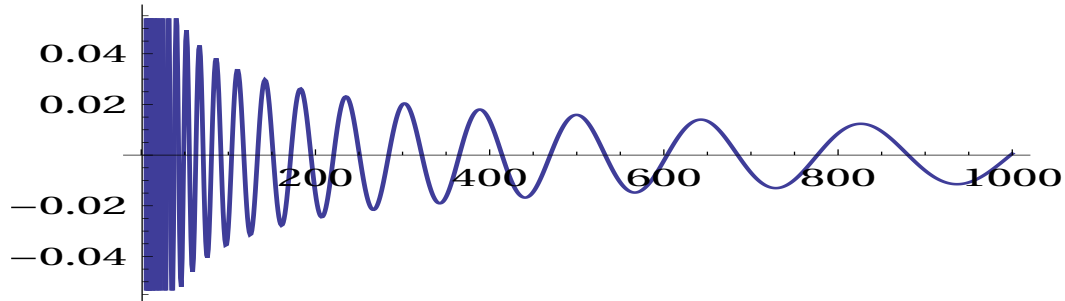


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 [10000000]=-0.0140059815308212903817
 [100000000]=-0.0139521725046484450922
 It does not converge to 0.

(25.0109 is non-trivial zero value. as it is.)

$$\sum_{n=1}^{1000} \left[\frac{\cos[(25.0109) \ln(2n-1)]}{(2n-1)^{0.5}} - \frac{\cos[(25.0109) \ln(2n)]}{(2n)^{0.5}} \right] \quad (22)$$

= 0.00056641687695438541751539844982701950807....

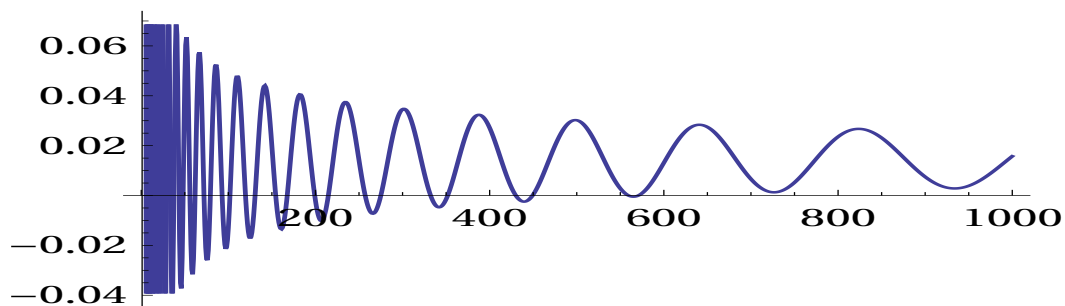


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 [100000000]=0.0000296005134758246658
 converge to 0.

(25.0109+0.01=25.0209)

$$\sum_{n=1}^{1000} \left[\frac{\cos[(25.0209) \ln(2n-1)]}{(2n-1)^{0.5}} - \frac{\cos[(25.0209) \ln(2n)]}{(2n)^{0.5}} \right] \quad (23)$$

= 0.0157543246388970080680775464029165522593....

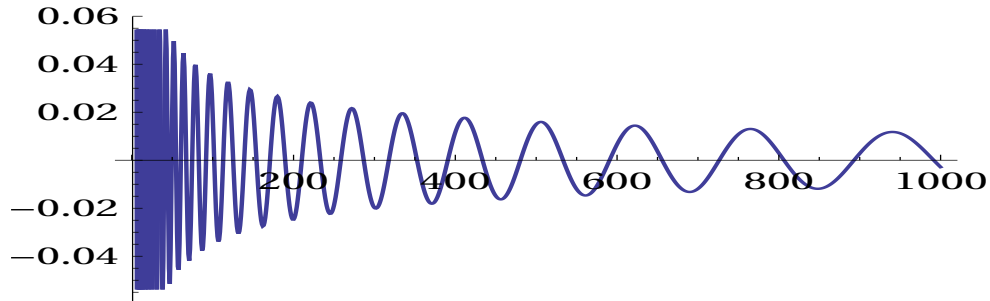


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 [100000000]=0.0143748762762403066440
 It does not converge to 0.

(30.4249 - 0.01=30.4149)

$$\sum_{n=1}^{1000} \left[\frac{\cos[(30.4149) \ln(2n-1)]}{(2n-1)^{0.5}} - \frac{\cos[(30.4149) \ln(2n)]}{(2n)^{0.5}} \right] \quad (24)$$

= -0.00285640901825724095173253445652917101....

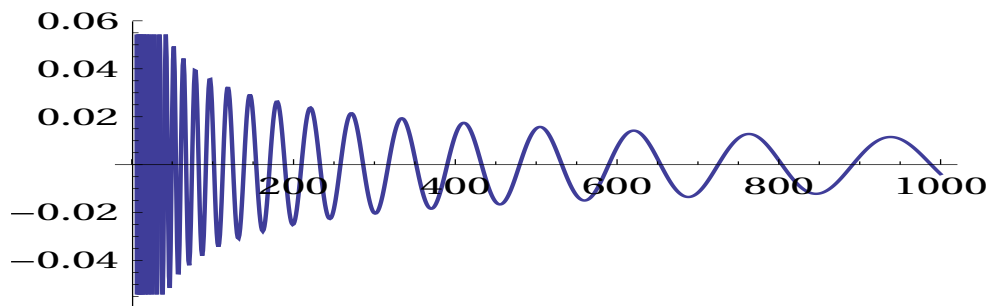


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 [10000000] = 0.0003267595999544659156
 [100000000] = 0.0002812429594458024443
 It does not converge to 0.

(30.4249 is non-trivial zero value. as it is.)

$$\sum_{n=1}^{1000} \left[\frac{\cos[(30.4249) \ln(2n-1)]}{(2n-1)^{0.5}} - \frac{\cos[(30.4249) \ln(2n)]}{(2n)^{0.5}} \right] \quad (25)$$

= -0.00390909023513576029354093055012477....

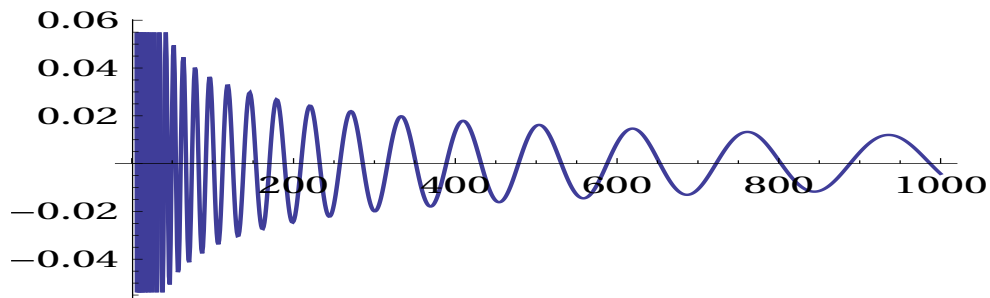


[10000] = -0.0033980444366637999748
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 [1000000] = 0.0000110835698303654228
 [10000000] = 0.0000925555270059981509
 [100000000] = 0.0000335427373431973819
 converge to 0.

(30.4249+0.01=30.4349)

$$\sum_{n=1}^{1000} \left[\frac{\cos[(30.4349) \ln(2n-1)]}{(2n-1)^{0.5}} - \frac{\cos[(30.4349) \ln(2n)]}{(2n)^{0.5}} \right] \quad (26)$$

= -0.004252440526184255650794899059877558....

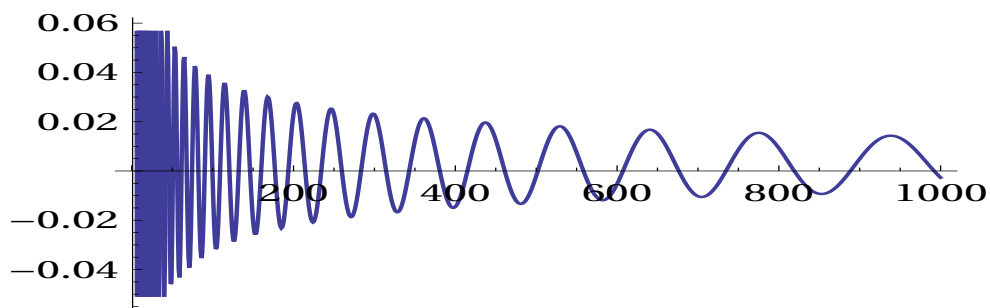


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 It does not converge to 0.

(32.9351 -0.01=32.9251)

$$\sum_{n=1}^{1000} \left[\frac{\cos[(32.9251) \ln(2n-1)]}{(2n-1)^{0.5}} - \frac{\cos[(32.9251) \ln(2n)]}{(2n)^{0.5}} \right] \quad (27)$$

= -0.0027020078807583326034090009613837....

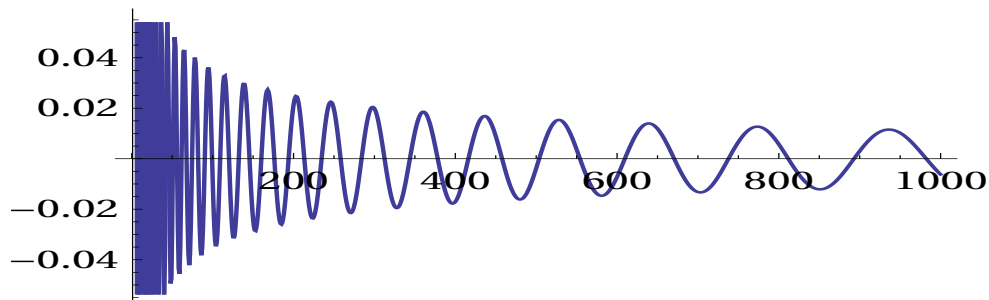


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 [10000000]=0.0026830551451150455762
 [100000000]=0.0027569421199088403086
 It does not converge to 0.

(32.9351 is non-trivial zero value. as it is.)

$$\sum_{n=1}^{1000} \left[\frac{\cos[(32.9351) \ln(2n-1)]}{(2n-1)^{0.5}} - \frac{\cos[(32.9351) \ln(2n)]}{(2n)^{0.5}} \right] \quad (28)$$

= -0.0062113502323384285481355315202462....

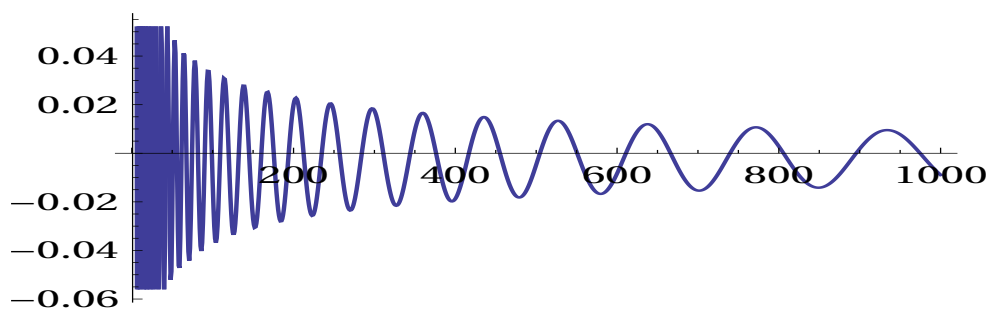


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 [1000000]=-0.0003446395140902848734
 [10000000]=-0.0000903248133043883523
 [100000000]=-0.0000221594074273025880
 converge to 0.

(32.9351+0.01= 32.9451)

$$\sum_{n=1}^{1000} \left[\frac{\cos[(32.9451) \ln(2n-1)]}{(2n-1)^{0.5}} - \frac{\cos[(32.9451) \ln(2n)]}{(2n)^{0.5}} \right] \quad (29)$$

= -0.00893128024726900802406637151594713....

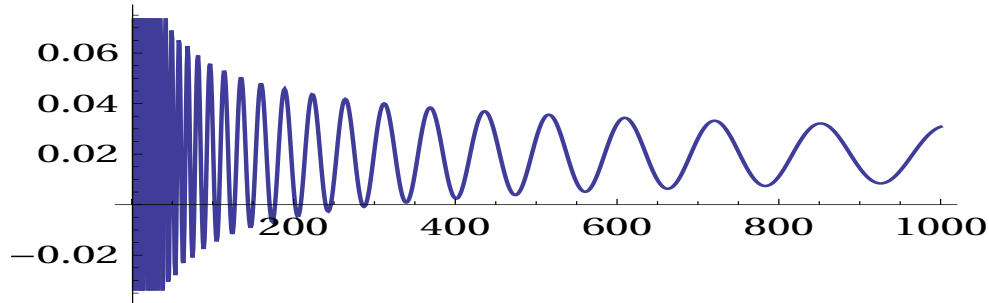


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 [10000000]=-0.0021078236331256560571
 [100000000]=-0.0020471956046321931888
 It does not converge to 0.

(37.5862- 0.01= 37.5762)

$$\sum_{n=1}^{1000} \left[\frac{\cos[(37.5762) \ln(2n - 1)]}{(2n - 1)^{0.5}} - \frac{\cos[(37.5762) \ln(2n)]}{(2n)^{0.5}} \right] \quad (30)$$

= 0.030834015062143617825619153097923....

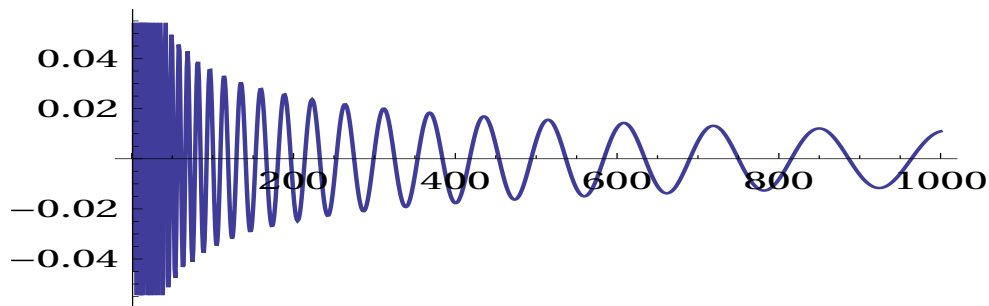


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 [100000000]=0.0200503760585013374174
 It does not converge to 0.

(37.5862 is non-trivial zero value. as it is.)

$$\sum_{n=1}^{1000} \left[\frac{\cos[(37.5862) \ln(2n - 1)]}{(2n - 1)^{0.5}} - \frac{\cos[(37.5862) \ln(2n)]}{(2n)^{0.5}} \right] \quad (31)$$

= 0.0109417953902648082779919017459911428....

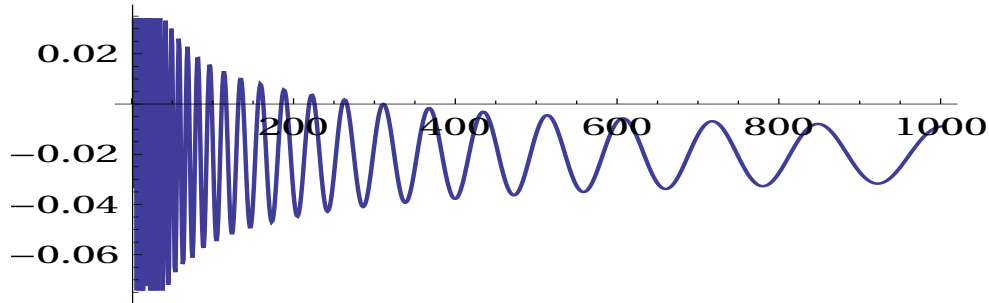


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 [1000000]=-0.0001343416061451328184
 [10000000]=0.0000587167172489908842
 [100000000]=-0.0000249459169129748873
 converge to 0.

(37.5862 +0.01= 37.5962)

$$\sum_{n=1}^{1000} \left[\frac{\cos[(37.5962) \ln(2n - 1)]}{(2n - 1)^{0.5}} - \frac{\cos[(37.5962) \ln(2n)]}{(2n)^{0.5}} \right] \quad (32)$$

= -0.0089460208968219524737939523273562....

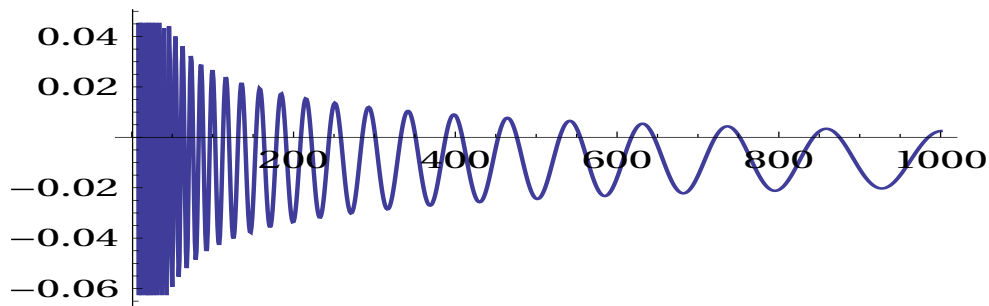


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 [100000000]=-0.0200331095329610020528
 It does not converge to 0.

(40.9187 -0.01= 40.9087)

$$\sum_{n=1}^{1000} \left[\frac{\cos[(40.9087) \ln(2n - 1)]}{(2n - 1)^{0.5}} - \frac{\cos[(40.9087) \ln(2n)]}{(2n)^{0.5}} \right] \quad (33)$$

=0.00248093561144567463626037082051005....

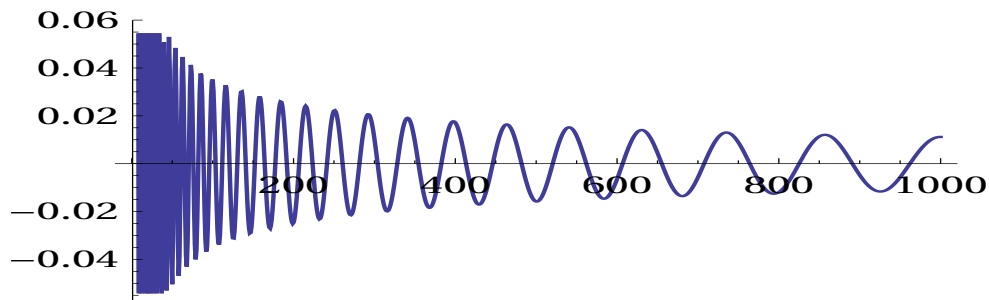


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 [10000000]=-0.0085680467375924898588
 [100000000]=-0.0086420189500060091981
 It does not converge to 0.

(40.9187 is non-trivial zero value. as it is.)

$$\sum_{n=1}^{1000} \left[\frac{\cos[(40.9187) \ln(2n-1)]}{(2n-1)^{0.5}} - \frac{\cos[(40.9187) \ln(2n)]}{(2n)^{0.5}} \right] \quad (34)$$

= 0.011161443040664347323838871759731....

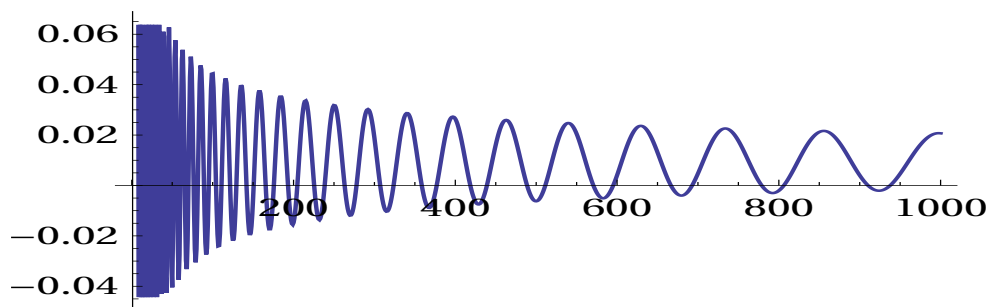


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 [100000000]=0.0000176604734510305102
 converge to 0.

(40.9187 +0.01= 40.9287)

$$\sum_{n=1}^{1000} \left[\frac{\cos[(40.9287) \ln(2n-1)]}{(2n-1)^{0.5}} - \frac{\cos[(40.9287) \ln(2n)]}{(2n)^{0.5}} \right] \quad (35)$$

= 0.0206878312138471015409368846686....

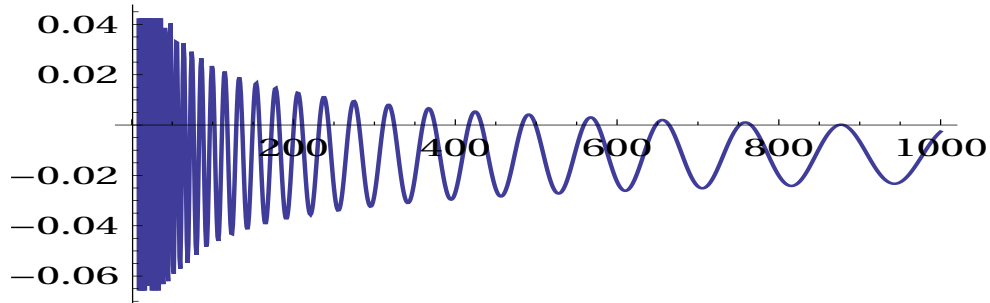


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 [100000000]=0.0095865032449445348323
 It does not converge to 0.

(43.3271 - 0.01 = 43.3171)

$$\sum_{n=1}^{1000} \left[\frac{\cos[(43.3171) \ln(2n-1)]}{(2n-1)^{0.5}} - \frac{\cos[(43.3171) \ln(2n)]}{(2n)^{0.5}} \right] \quad (36)$$

= -0.0026271844642819244706123872647....

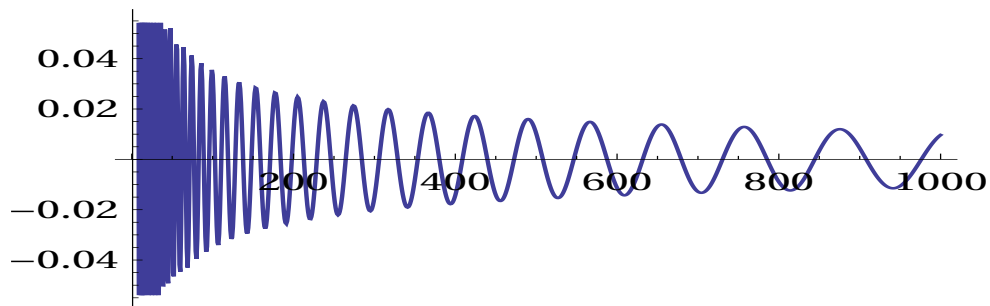


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 [100000000]=-0.0118126252156423548756
 It does not converge to 0.

(43.3271 is non-trivial zero value. as it is.)

$$\sum_{n=1}^{1000} \left[\frac{\cos[(43.3271) \ln(2n-1)]}{(2n-1)^{0.5}} - \frac{\cos[(43.3271) \ln(2n)]}{(2n)^{0.5}} \right] \quad (37)$$

= 0.009670906260156884143514330311804340....

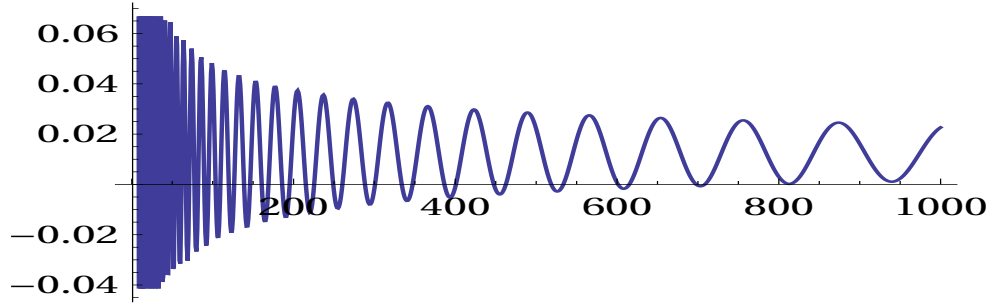


[10000]=0.0009520515105505345573
 [100000]=-0.0005078252057554809556
 [1000000]=-0.0003051887688908388216
 [10000000]=-0.0000672058546933808392
 converge to 0.

$$(43.3271 + 0.01 = 43.3371)$$

$$\sum_{n=1}^{1000} \left[\frac{\cos[(43.3371) \ln(2n-1)]}{(2n-1)^{0.5}} - \frac{\cos[(43.3371) \ln(2n)]}{(2n)^{0.5}} \right] \quad (38)$$

$$= 0.0096709062601568841435143303118....$$

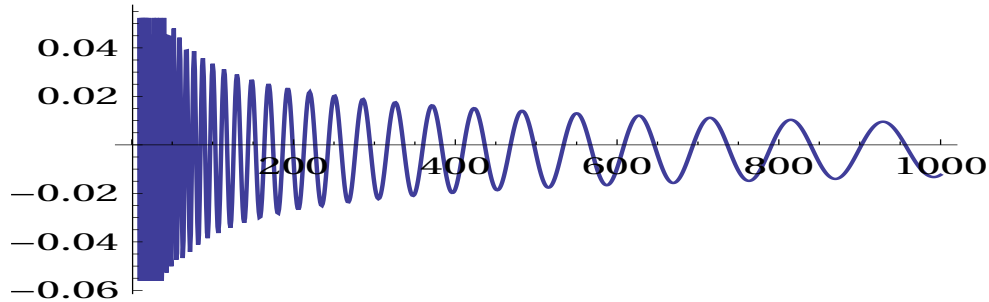


[10000]=0.0138611334436689482424
 [100000]=0.0121914127967915099371
 [1000000]= 0.0122894928302838823964
 [10000000]=0.0125018265102611169509
 It does not converge to 0.

$$(48.0052 - 0.01 = 47.9952)$$

$$\sum_{n=1}^{1000} \left[\frac{\cos[(47.9952) \ln(2n-1)]}{(2n-1)^{0.5}} - \frac{\cos[(47.9952) \ln(2n)]}{(2n)^{0.5}} \right] \quad (39)$$

$$= -0.012377763685720218921643303546....$$

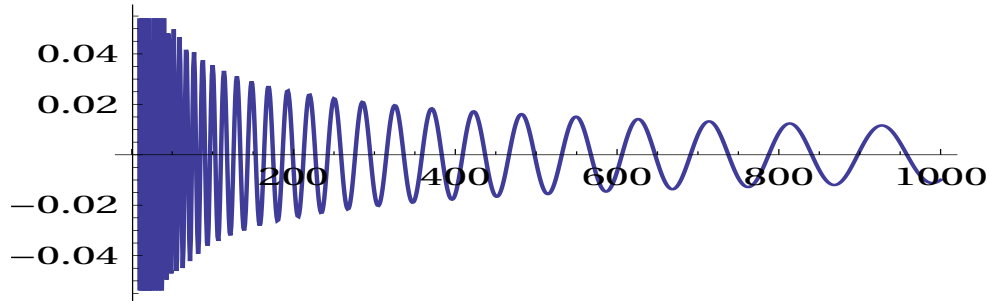


[10000]=0.0000285799991242556995
 [100000]=-0.0021376413863578289966
 [1000000]=-0.0022192255925806937331
 [10000000]=-0.0019585239647509334292
 It does not converge to 0.

(48.0052 is non-trivial zero value. as it is.)

$$\sum_{n=1}^{1000} \left[\frac{\cos[(48.0052) \ln(2n-1)]}{(2n-1)^{0.5}} - \frac{\cos[(48.0052) \ln(2n)]}{(2n)^{0.5}} \right] \quad (40)$$

= -0.009954710963835234494265321374....

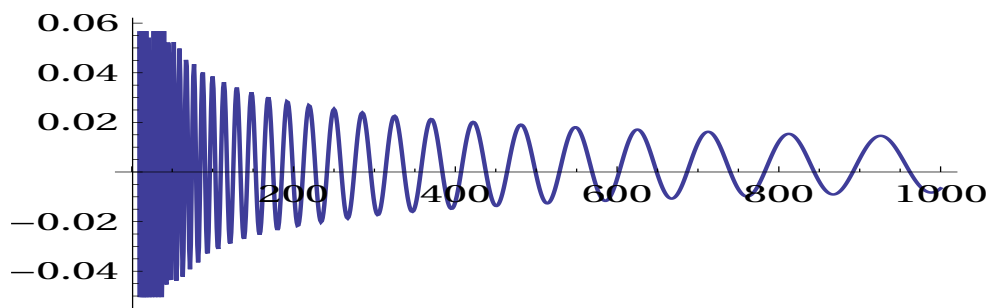


[10000]=0.0018032285340410843938
 [100000]=0.0000660014107200388242
 [1000000]=-0.0001954933851270815727
 [10000000]=0.0001168501874528188322
 [100000000]=-0.0000222158682941726699
 converge to 0.

(48.0052 +0.01=48.0152)

$$\sum_{n=1}^{1000} \left[\frac{\cos[(48.0152) \ln(2n-1)]}{(2n-1)^{0.5}} - \frac{\cos[(48.0152) \ln(2n)]}{(2n)^{0.5}} \right] \quad (41)$$

= -0.00659781565293379915294435589....

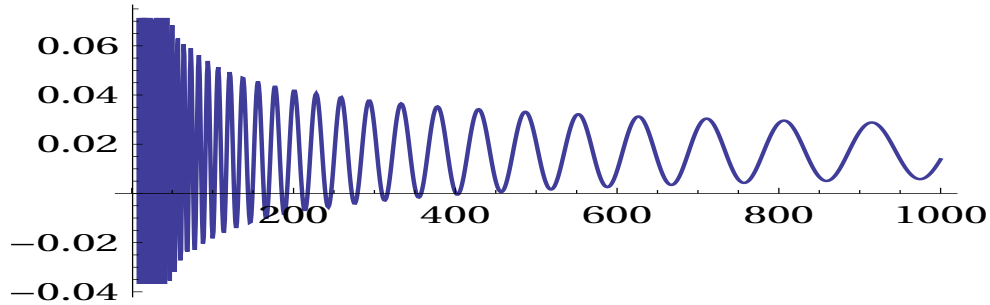


[10000]= 0.0044366094516016078841
 [100000]=0.0031451285025022525550
 [1000000]=0.0027088886322526439104
 [10000000]=0.0030655599344365370811
 [100000000]=0.0029234203769221956369
 It does not converge to 0.

(49.7738- 0.01=49.7638)

$$\sum_{n=1}^{1000} \left[\frac{\cos[(49.7638) \ln(2n - 1)]}{(2n - 1)^{0.5}} - \frac{\cos[(49.7638) \ln(2n)]}{(2n)^{0.5}} \right] \quad (42)$$

= 0.013838181877048842824089368339....

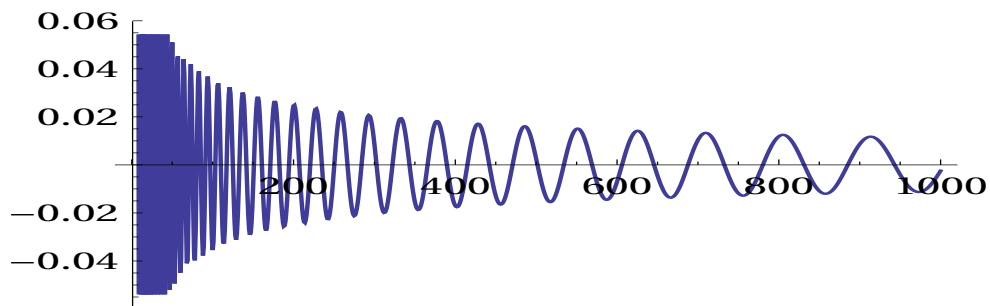


[10000]=0.0204037589236460217834
 [100000]=0.0176524483959972777747
 [1000000]=0.0168391658695661756984
 [10000000]=0.0170716013967882086766
 [100000000]=0.0171650920761718187024
 It does not converge to 0.

(49.7738 is non-trivial zero value. as it is.)

$$\sum_{n=1}^{1000} \left[\frac{\cos[(49.7738) \ln(2n - 1)]}{(2n - 1)^{0.5}} - \frac{\cos[(49.7738) \ln(2n)]}{(2n)^{0.5}} \right] \quad (43)$$

= -0.00242552247843460002977902405986....

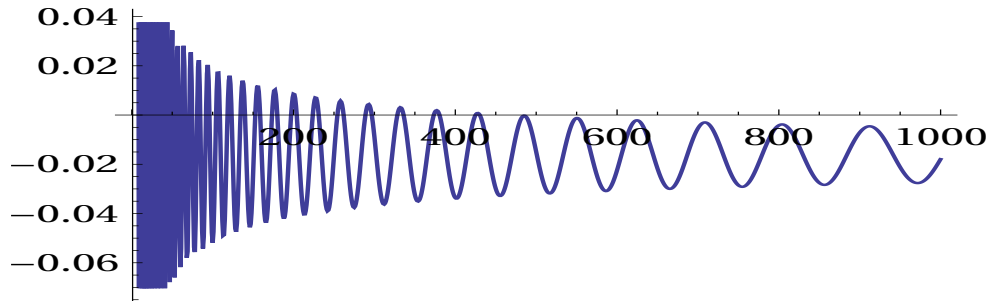


[10000]=0.0034374613798155602418
 [100000]=0.0004433508278073949134
 [1000000]=-0.0002692269558208497827
 [10000000]=0.0000031448364606872906
 [100000000]=0.0000016971109376292873
 converge to 0.

(49.7738+ 0.01=49.7838)

$$\sum_{n=1}^{1000} \left[\frac{\cos[(49.7838) \ln(2n - 1)]}{(2n - 1)^{0.5}} - \frac{\cos[(49.7838) \ln(2n)]}{(2n)^{0.5}} \right] \quad (44)$$

= -0.01792553042791727447634460232379546....

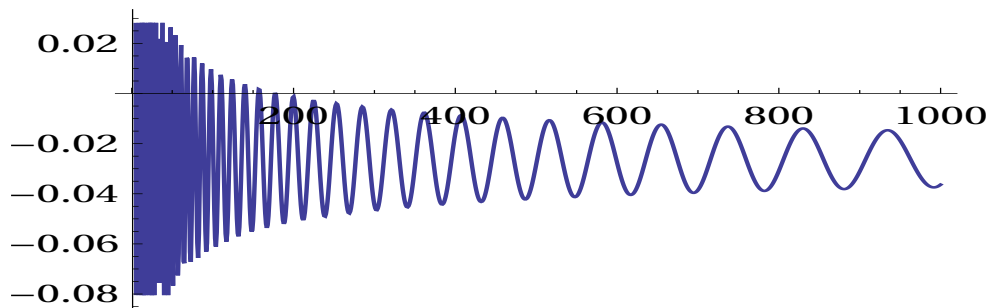


[10000]=-0.0128126155902118996077
 [100000]=-0.0160221607044494576688
 [1000000]=-0.0166214463360710926199
 [10000000]=-0.0163144944504915699601
 [100000000]=-0.0162474302505595455398
 It does not converge to 0.

(52.9703 -0.01=52.9603)

$$\sum_{n=1}^{1000} \left[\frac{\cos[(52.9603) \ln(2n - 1)]}{(2n - 1)^{0.5}} - \frac{\cos[(52.9603) \ln(2n)]}{(2n)^{0.5}} \right] \quad (45)$$

= -0.036355181418336957787246132966042....

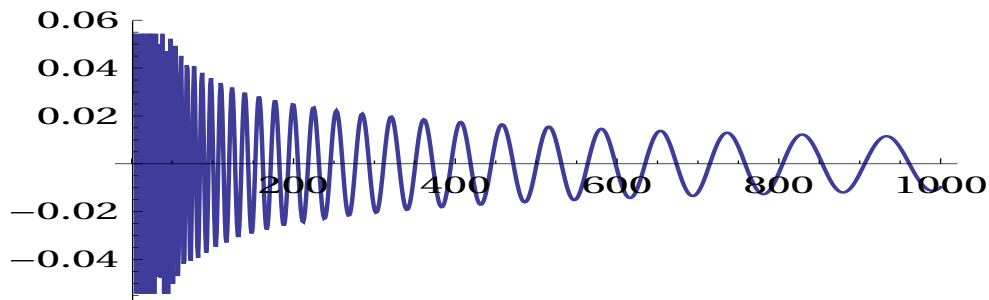


[10000]=-0.0227243930148252754053
 [100000]=-0.0270512158174514988351
 [1000000]=-0.0261265188041285185971
 [10000000]=-0.0261841661259985397647
 [100000000]=-0.0262460615983426404085
 It does not converge to 0.

(52.9703 is non-trivial zero value. as it is.)

$$\sum_{n=1}^{1000} \left[\frac{\cos[(52.9703) \ln(2n-1)]}{(2n-1)^{0.5}} - \frac{\cos[(52.9703) \ln(2n)]}{(2n)^{0.5}} \right] \quad (46)$$

=0.0094785200140687480985874....

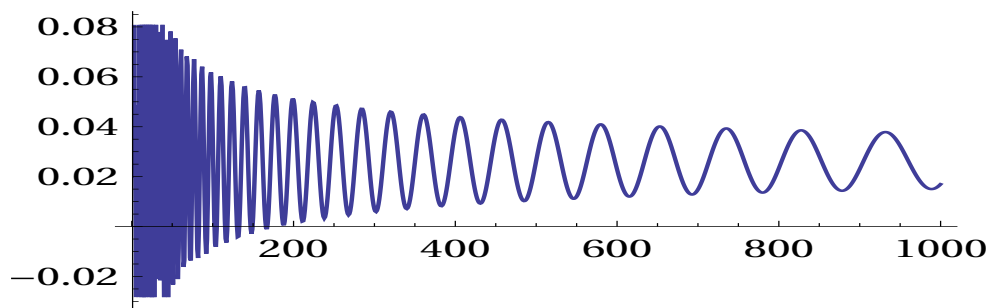


[10000]=0.0034739734404261226469
 [100000]=-0.0009736503195389328066
 [1000000]=0.0000840864838235658814
 [10000000]=-0.0000402288186734236711
 [100000000]=-0.0000791109926 464973008
 converge to 0.

(52.9703+ 0.01=52.9803)

$$\sum_{n=1}^{1000} \left[\frac{\cos[(52.9803) \ln(2n-1)]}{(2n-1)^{0.5}} - \frac{\cos[(52.9803) \ln(2n)]}{(2n)^{0.5}} \right] \quad (47)$$

= -0.025638210257456366874529600147.....

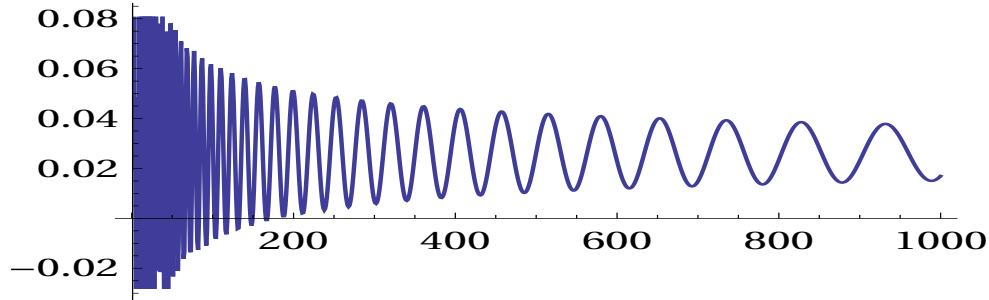


[10000]=0.0298009149632027132981
 [100000]=0.0252807368145561497941
 [1000000]=0.0264549124817869858728
 [10000000]=0.0262664254861674946462
 [100000000]=0.0262518399485283625283
 It does not converge to 0.

(56.4462- 0.01=56.4362)

$$\sum_{n=1}^{1000} \left[\frac{\cos[(52.9603) \ln(2n - 1)]}{(2n - 1)^{0.5}} - \frac{\cos[(52.9603) \ln(2n)]}{(2n)^{0.5}} \right] \quad (48)$$

= 0.02661362850362773718971974636737....

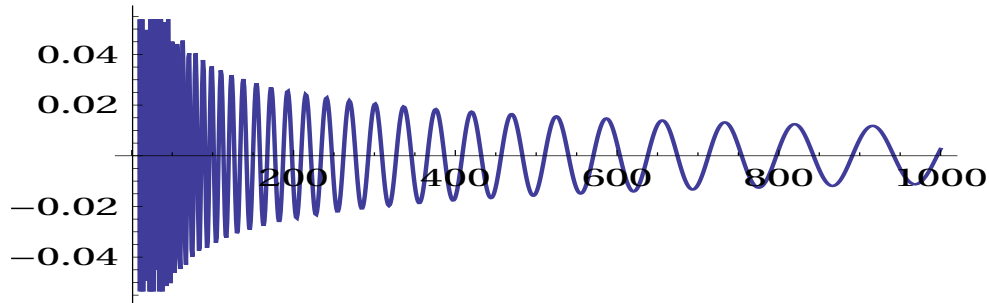


[10000]=0.0215213375849595336953
 [100000]=0.0256454199486976612554
 [1000000]=0.0250592910221035559959
 [10000000]=0.0248005396480182084551
 [100000000]=0.0249269290298672584194
 It does not converge to 0.

(56.4462 is non-trivial zero value. as it is.)

$$\sum_{n=1}^{1000} \left[\frac{\cos[(52.9603) \ln(2n - 1)]}{(2n - 1)^{0.5}} - \frac{\cos[(52.9603) \ln(2n)]}{(2n)^{0.5}} \right] \quad (49)$$

= 0.00265184131020865474001054929688....

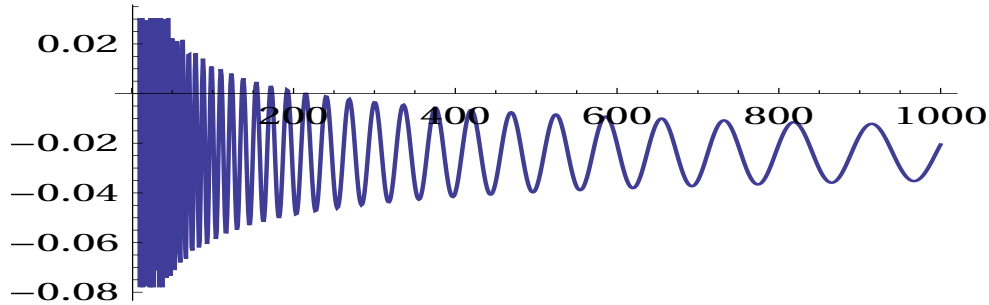


[10000]=-0.0033569416558486631433
 [100000]=0.0007412009666034661236
 [1000000]=0.0003082564029241538104
 [10000000]=0.0000061648527900334994
 [100000000]=0.0001245625213175247570
 converge to 0.

(56.4462+ 0.01=56.4562)

$$\sum_{n=1}^{1000} \left[\frac{\cos[(56.4562) \ln(2n - 1)]}{(2n - 1)^{0.5}} - \frac{\cos[(56.4562) \ln(2n)]}{(2n)^{0.5}} \right] \quad (50)$$

= -0.020518507917862853064414308975874....

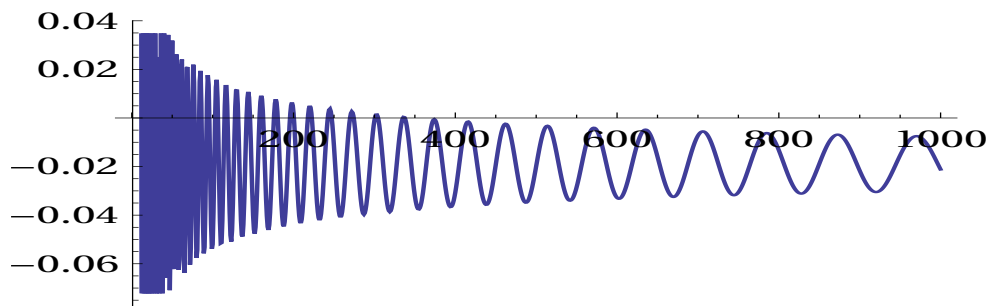


[10000]=-0.0273951025018738907046
 [100000]=-0.0233662356193842200847
 [1000000]=-0.0236407303330016561882
 [10000000]=-0.0239790227111441045516
 [100000000]=-0.0238720224947596565412
 It does not converge to 0.

(59.3470 -0.01=59.3370)

$$\sum_{n=1}^{1000} \left[\frac{\cos[(59.337) \ln(2n - 1)]}{(2n - 1)^{0.5}} - \frac{\cos[(59.337) \ln(2n)]}{(2n)^{0.5}} \right] \quad (51)$$

= -0.02117544407868147009046644659813....

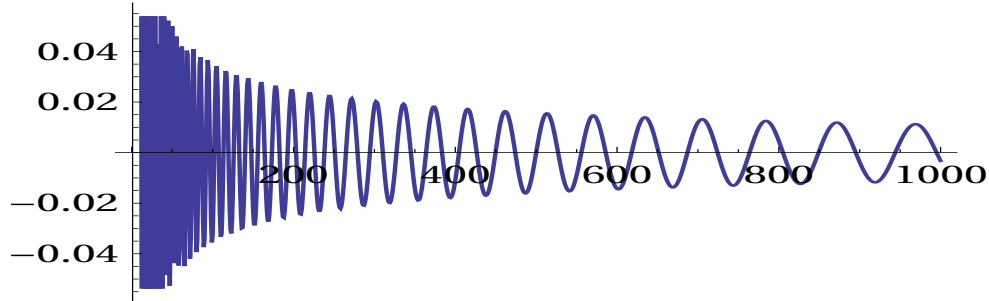


[10000]=-0.0153470935301642623372
 [100000]=-0.0186832345035133039202
 [1000000]=-0.0191851092465768376105
 [10000000]=-0.0188416207259528324658
 [100000000]=-0.0187981369915568748141
 It does not converge to 0.

(59.3470 is non-trivial zero value. as it is.)

$$\sum_{n=1}^{1000} \left[\frac{\cos[(59.347) \ln(2n-1)]}{(2n-1)^{0.5}} - \frac{\cos[(59.347) \ln(2n)]}{(2n)^{0.5}} \right] \quad (52)$$

= -0.003249397427817426257297031928....

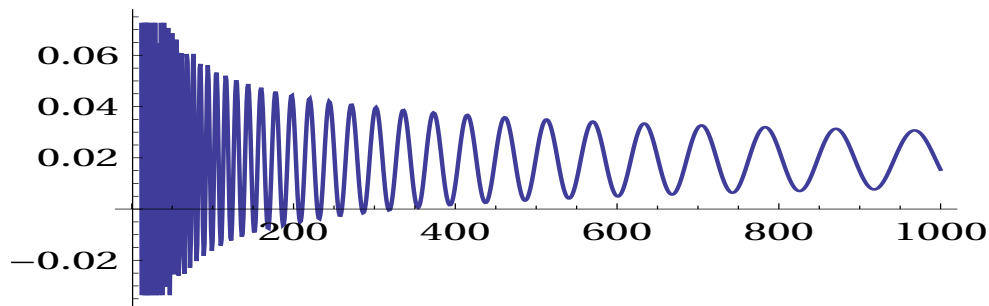


[10000]=0.0033272037996214297653
 [100000]=0.0001999944676262767817
 [1000000]=-0.0004266637864907864286
 [10000000]=-0.0001107110726185287755
 [100000000]=-0.0000496121879175364362
 converge to 0.

(59.3470 +0.01=59.3570)

$$\sum_{n=1}^{1000} \left[\frac{\cos[(59.357) \ln(2n-1)]}{(2n-1)^{0.5}} - \frac{\cos[(59.357) \ln(2n)]}{(2n)^{0.5}} \right] \quad (53)$$

= 0.0153674637271575901453641388809426....

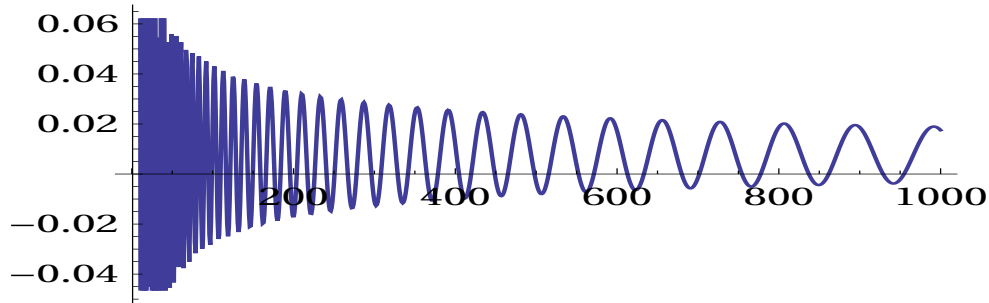


[10000]=0.0226406059802710668549
 [100000]=0.0197515319113135204288
 [1000000]=0.0190115164934722205570
 [10000000]=0.0192934859950445840304
 [100000000]=0.0193701943315789659739
 It does not converge to 0.

(60.8318 - 0.01 = 60.8218)

$$\sum_{n=1}^{1000} \left[\frac{\cos[(60.8218) \ln(2n-1)]}{(2n-1)^{0.5}} - \frac{\cos[(60.8218) \ln(2n)]}{(2n)^{0.5}} \right] \quad (54)$$

= 0.017535560535969578881737935277711....

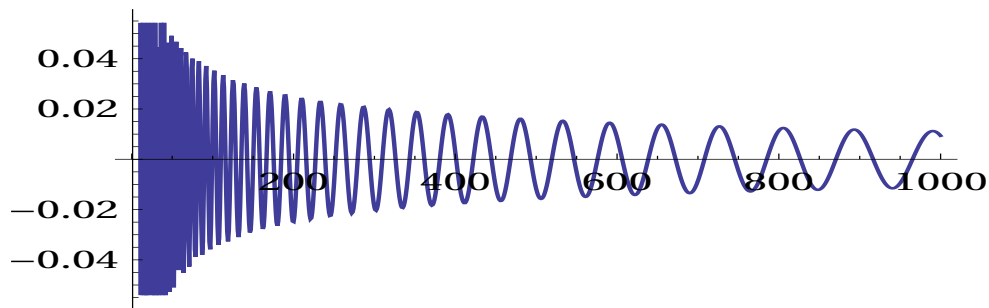


[10000]=0.0053634168996513102365
 [100000]=0.0071097290555579180371
 [1000000]=0.0080656137459530069522
 [10000000]=0.0077438534214533767328
 [100000000]=0.0076979062723852836186
 It does not converge to 0.

(60.8318 is non-trivial zero value. as it is.)

$$\sum_{n=1}^{1000} \left[\frac{\cos[(60.8318) \ln(2n-1)]}{(2n-1)^{0.5}} - \frac{\cos[(60.8318) \ln(2n)]}{(2n)^{0.5}} \right] \quad (55)$$

= 0.00935045339563112002833035659962320....

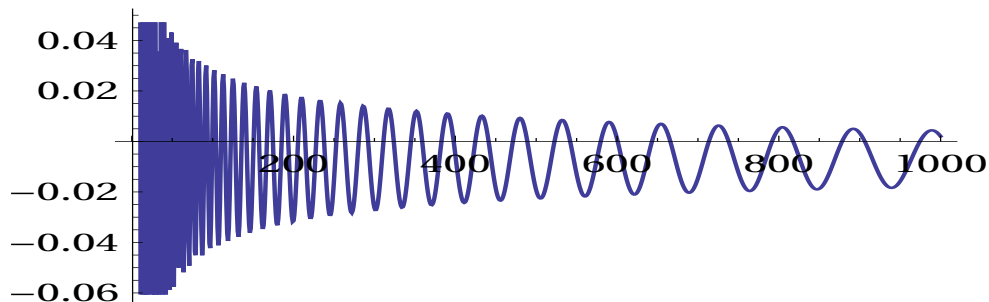


[10000]=-0.0026329489910695037802
 [100000]=-0.0005211427047658763467
 [1000000]=0.0003308650681597519964
 [10000000]=-0.0000234504367579117287
 [100000000]=-0.0000489979146843307173
 converge to 0.

(60.8318 +0.01=60.8418)

$$\sum_{n=1}^{1000} \left[\frac{\cos[(60.8418) \ln(2n-1)]}{(2n-1)^{0.5}} - \frac{\cos[(60.8418) \ln(2n)]}{(2n)^{0.5}} \right] \quad (56)$$

= 0.0020340324872867370159732423317063180....



[10000]=-0.0096808902961095563006

[100000]=-0.0072217173963795193783

[1000000]=-0.0064883898884115342315

[10000000]=-0.0068677592993540365410

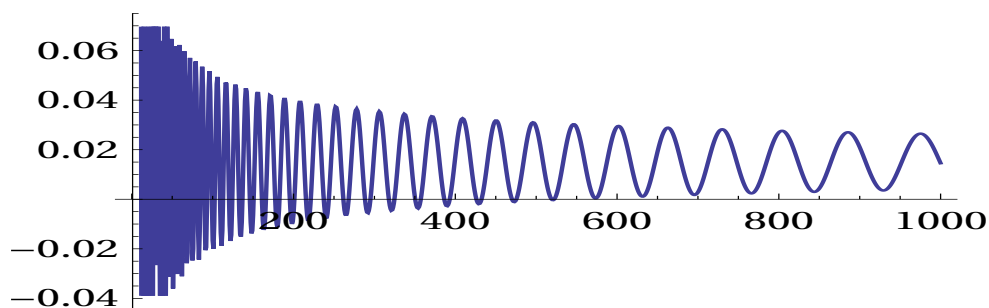
[100000000]=-0.0068719124842466644543

It does not converge to 0.

(65.1125 -0.01=65.1025)

$$\sum_{n=1}^{1000} \left[\frac{\cos[(65.1025) \ln(2n-1)]}{(2n-1)^{0.5}} - \frac{\cos[(65.1025) \ln(2n)]}{(2n)^{0.5}} \right] \quad (57)$$

= 0.01455354766716725850019791519965069408....



[10000]=0.0178130662139432995039

[100000]=0.0162484992948911007027

[1000000]=0.0153178316294963045435

[10000000]=0.0151053012272931840715

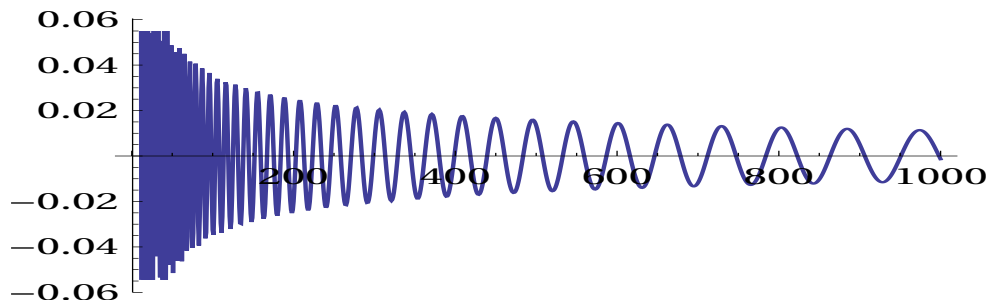
[100000000]=0.0151140151910756879994

It does not converge to 0.

(65.1125 is non-trivial zero value. as it is.)

$$\sum_{n=1}^{1000} \left[\frac{\cos[(65.1125) \ln(2n-1)]}{(2n-1)^{0.5}} - \frac{\cos[(65.1125) \ln(2n)]}{(2n)^{0.5}} \right] \quad (58)$$

= -0.0013760257837058265259987472825....

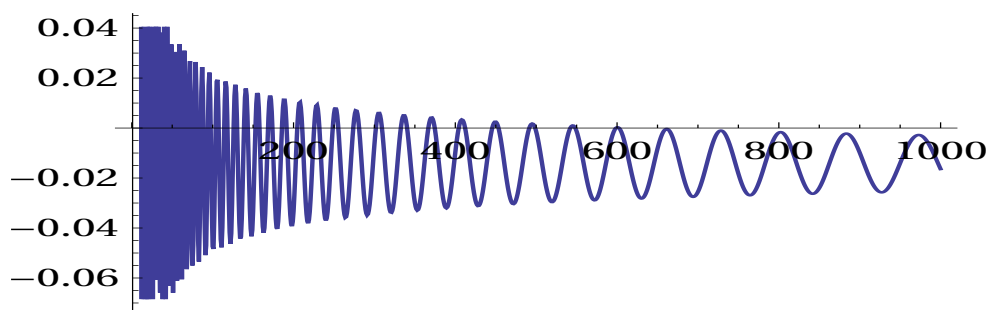


[10000]=0.0024868485483015901651
 [100000]=0.0011808038497076905112
 [1000000]=0.0002774053647495089620
 [10000000]=0.0000397292122541242009
 [100000000]=0.0000330684738521100997
 converge to 0.

(65.1125 +0.01=65.1225)

$$\sum_{n=1}^{1000} \left[\frac{\cos[(65.1225) \ln(2n-1)]}{(2n-1)^{0.5}} - \frac{\cos[(65.1225) \ln(2n)]}{(2n)^{0.5}} \right] \quad (59)$$

= -0.01639371889042223977588544036025566....

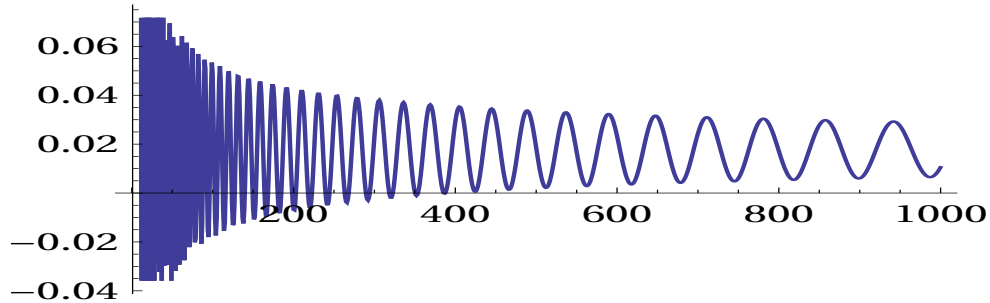


[10000]=-0.0119595467599865334929
 [100000]=-0.0129999415740921740736
 [1000000]=-0.0138639340077547287833
 [10000000]=-0.0141215839941903811144
 [100000000]=-0.0141431734096021752972
 It does not converge to 0.

(67.0798 - 0.01 = 67.0698)

$$\sum_{n=1}^{1000} \left[\frac{\cos[(67.0698) \ln(2n-1)]}{(2n-1)^{0.5}} - \frac{\cos[(67.0698) \ln(2n)]}{(2n)^{0.5}} \right] \quad (60)$$

= 0.01054340101298597874827370995356065....

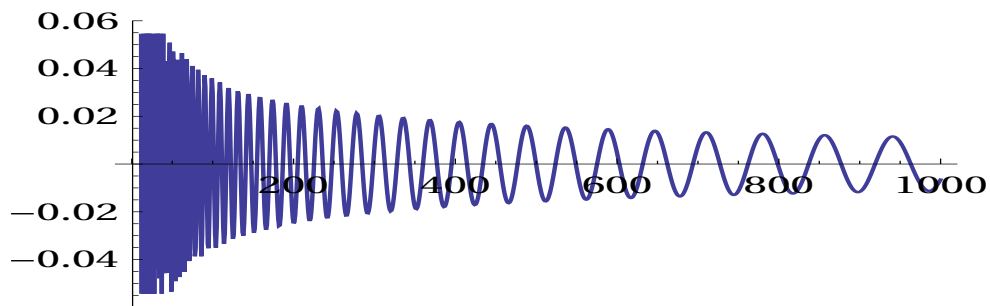


[10000]=0.0185272576419921730650
 [100000]=0.0180575446703839549711
 [1000000]=0.0175087936290795401217
 [10000000]=0.0178615209629044355277
 [100000000]=0.0177201662173655516419
 It does not converge to 0.

(67.0798 is non-trivial zero value. as it is.)

$$\sum_{n=1}^{1000} \left[\frac{\cos[(67.0798) \ln(2n-1)]}{(2n-1)^{0.5}} - \frac{\cos[(67.0798) \ln(2n)]}{(2n)^{0.5}} \right] \quad (61)$$

= -0.0065237542293612301177290343425925....

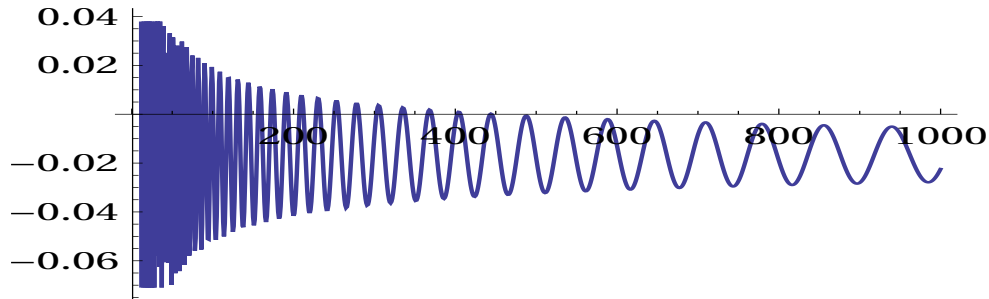


[10000]=0.0004455620242284032877
 [100000]=0.0004495504034751115607
 [1000000]=-0.0002621111366443582480
 [10000000]=0.0001288477260946204589
 [100000000]=-0.0000147163868139592400
 converge to 0.

(67.0798 +0.01=67.0898)

$$\sum_{n=1}^{1000} \left[\frac{\cos[(67.0898) \ln(2n-1)]}{(2n-1)^{0.5}} - \frac{\cos[(67.0898) \ln(2n)]}{(2n)^{0.5}} \right] \quad (62)$$

= -0.022435645618969822822622562110867639....

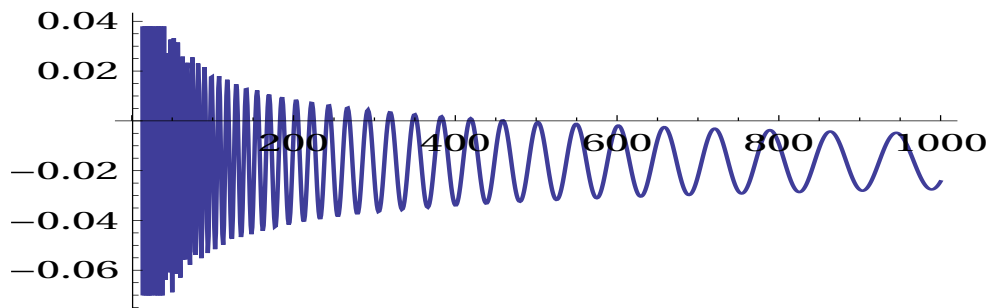


[10000]=-0.0165228379532093849758
 [100000]=-0.0160473792921948035795
 [1000000]=-0.0169096431198623928238
 [10000000]=-0.0164894634928593915302
 [100000000]=-0.0166309192179651989252
 It does not converge to 0.

(69.5464 -0.01= 69.5364)

$$\sum_{n=1}^{1000} \left[\frac{\cos[(69.5364) \ln(2n-1)]}{(2n-1)^{0.5}} - \frac{\cos[(69.5364) \ln(2n)]}{(2n)^{0.5}} \right] \quad (63)$$

= -0.0243297577962054059566184331757303259....

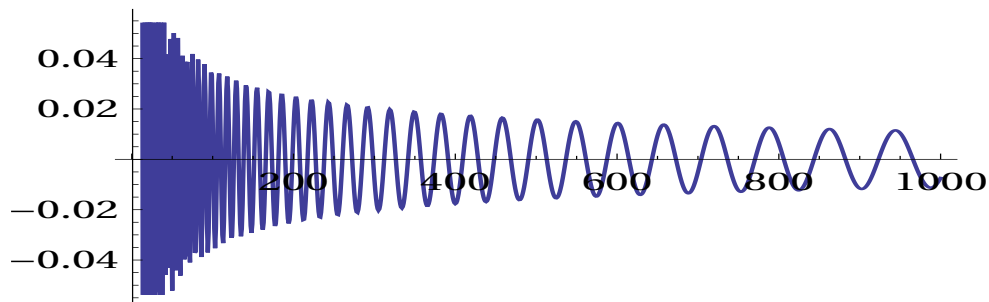


[10000]=-0.0134734792416161801992
 [100000]=-0.0172578985580090112084
 [1000000]=-0.0159753770631393052226
 [10000000]=-0.0164030485920629576224
 [100000000]=-0.0162623947872419447047
 It does not converge to 0.

(69.5464 is non-trivial zero value. as it is.)

$$\sum_{n=1}^{1000} \left[\frac{\cos[(69.5464) \ln(2n-1)]}{(2n-1)^{0.5}} - \frac{\cos[(69.5464) \ln(2n)]}{(2n)^{0.5}} \right] \quad (64)$$

= -0.00742194981868251334108790488075153....



[10000]=0.0025963455525007681293

[100000]=-0.0008871211367050240836

[1000000]=0.0002940474711544655657

[10000000]=-0.0001016062203650079822

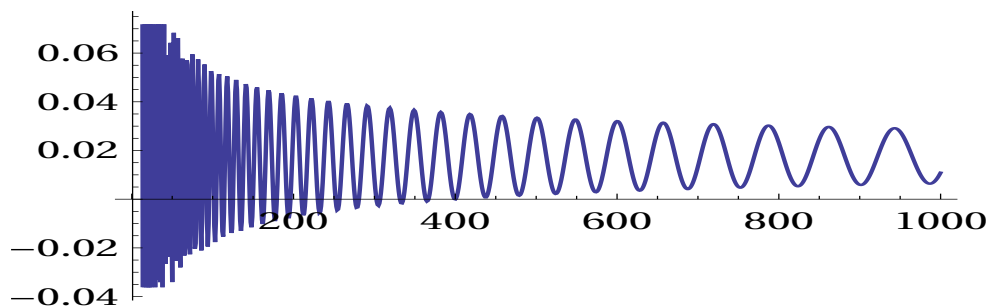
[100000000]=0.0000296025170157569742

converge to 0.

(69.5464 +0.01=69.5564)

$$\sum_{n=1}^{1000} \left[\frac{\cos[(69.5564) \ln(2n-1)]}{(2n-1)^{0.5}} - \frac{\cos[(69.5564) \ln(2n)]}{(2n)^{0.5}} \right] \quad (65)$$

= 0.010867804829161603203853104882137222....



[10000]=0.0199797996968321539546

[100000]=0.0168359155842571633910

[1000000]=0.0178963339534679265197

[10000000]=0.0175417209470739889066

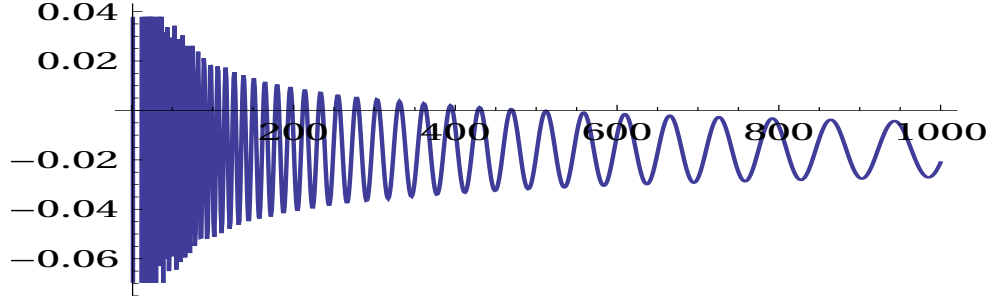
[100000000]=0.0176595177076413131778

It does not converge to 0.

(72.0672 - 0.01 = 72.0572)

$$\sum_{n=1}^{1000} \left[\frac{\cos[(72.0572) \ln(2n-1)]}{(2n-1)^{0.5}} - \frac{\cos[(72.0572) \ln(2n)]}{(2n)^{0.5}} \right] \quad (66)$$

= -0.0210743033551647014364941401522796....



[10000] = -0.0126713775327911490343

[100000] = -0.0169220760051842292193

[1000000] = -0.0155397673872098192327

[10000000] = -0.0158425049243976420743

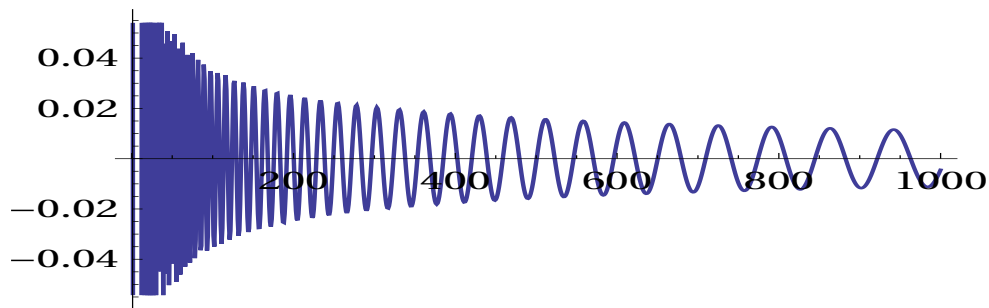
[100000000] = -0.0158212729604979597531

It does not converge to 0.

(72.0672 is non-trivial zero value. as it is.)

$$\sum_{n=1}^{1000} \left[\frac{\cos[(72.0672) \ln(2n-1)]}{(2n-1)^{0.5}} - \frac{\cos[(72.0672) \ln(2n)]}{(2n)^{0.5}} \right] \quad (67)$$

= -0.004433077941905571139525695057394011....



[10000] = 0.0030294285324277098019

[100000] = -0.0010518535189544097729

[1000000] = 0.0003671456814411551135

[10000000] = 0.0000169455603833922448

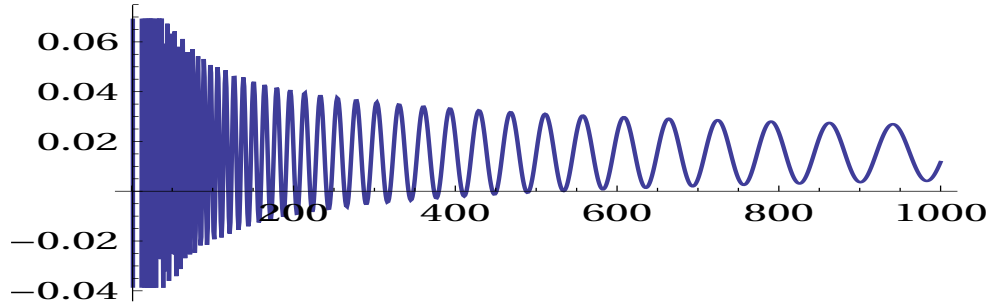
[100000000] = 0.0000622802048020602324

converge to 0.

(72.0672 +0.01=72.0772)

$$\sum_{n=1}^{1000} \left[\frac{\cos[(72.0672) \ln(2n - 1)]}{(2n - 1)^{0.5}} - \frac{\cos[(72.0672) \ln(2n)]}{(2n)^{0.5}} \right] \quad (68)$$

= 0.01170363676792169905229332806333232....

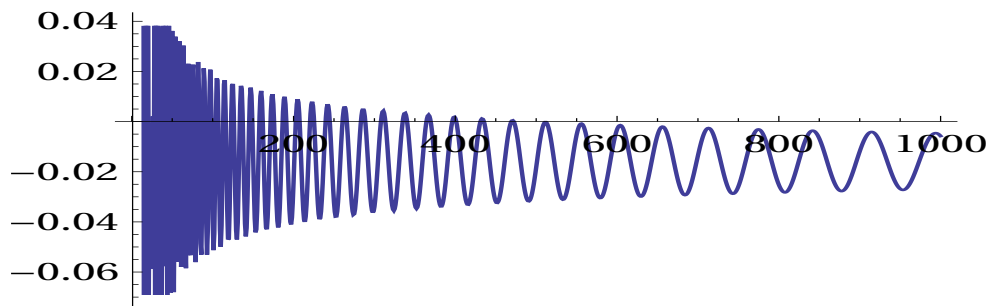


[10000]=0.0181707007646028824432
 [100000]=0.0143045111219020221194
 [1000000]=0.0157372394547144987820
 [10000000]=0.0153472886281138462539
 [100000000]=0.0154154791762151199136
 It does not converge to 0.

(75.7047 -0.01=75.6947)

$$\sum_{n=1}^{1000} \left[\frac{\cos[(75.6947) \ln(2n - 1)]}{(2n - 1)^{0.5}} - \frac{\cos[(75.6947) \ln(2n)]}{(2n)^{0.5}} \right] \quad (69)$$

= -0.005767602040275194888056795583206626735159....

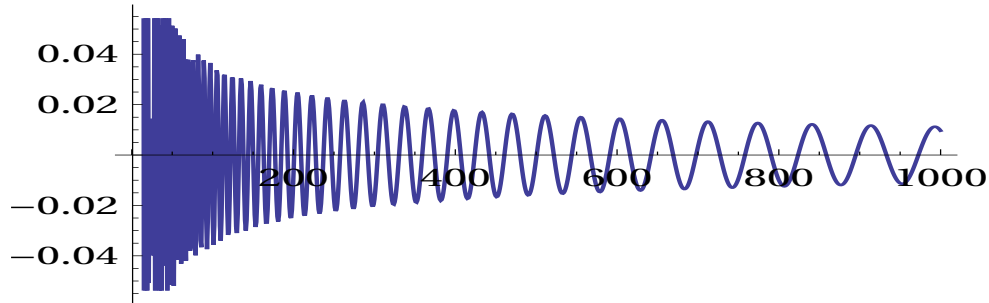


[10000]=-0.0145183117659648756176
 [100000]=-0.0168743137361940659380
 [1000000]=-0.0158932270594019514620
 [10000000]=-0.0156984831255221751745
 [100000000]=-0.0158045871196352515076
 It does not converge to 0.

(75.7047 is non-trivial zero value. as it is.)

$$\sum_{n=1}^{1000} \left[\frac{\cos[(75.7047) \ln(2n-1)]}{(2n-1)^{0.5}} - \frac{\cos[(75.7047) \ln(2n)]}{(2n)^{0.5}} \right] \quad (70)$$

= 0.00965362801211004223122426163063638....

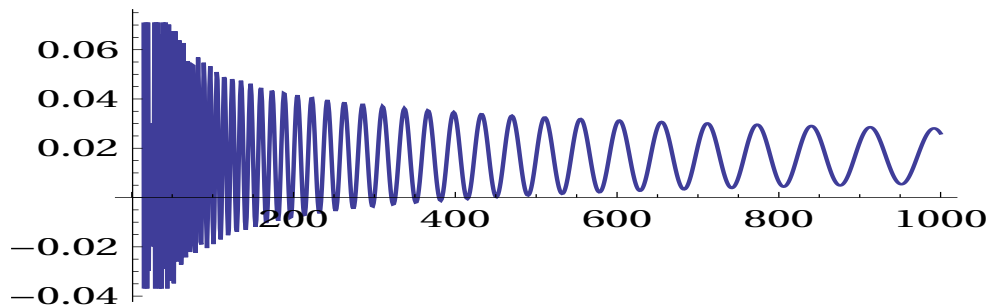


[10000]=0.0016245600108993024473
 [100000]=-0.0010015153125604158314
 [1000000]=-0.0001182290513657512342
 [10000000]=0.0001204084346666212352
 [100000000]=0.0000257517189773427849
 converge to 0.

(75.7047 +0.01=75.7147)

$$\sum_{n=1}^{1000} \left[\frac{\cos[(75.7147) \ln(2n-1)]}{(2n-1)^{0.5}} - \frac{\cos[(75.7147) \ln(2n)]}{(2n)^{0.5}} \right] \quad (71)$$

= 0.02603757915450419183152249404869049....

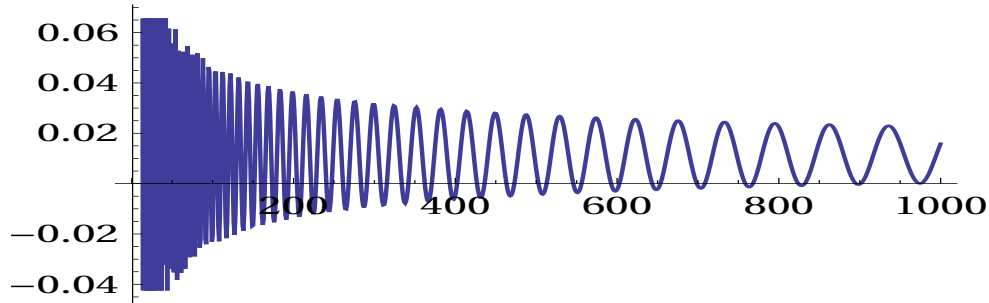


[10000]=0.0187700429043501960946
 [100000]=0.0159047949088703503839
 [1000000]=0.0166779554338473551267
 [10000000]=0.0169547162854766578222
 [100000000]=0.0168740888732249530446
 It does not converge to 0.

(77.1448 - 0.01 = 77.1348)

$$\sum_{n=1}^{1000} \left[\frac{\cos[(77.1348) \ln(2n-1)]}{(2n-1)^{0.5}} - \frac{\cos[(77.1348) \ln(2n)]}{(2n)^{0.5}} \right] \quad (72)$$

= 0.01583745539074428146647286370734127500....

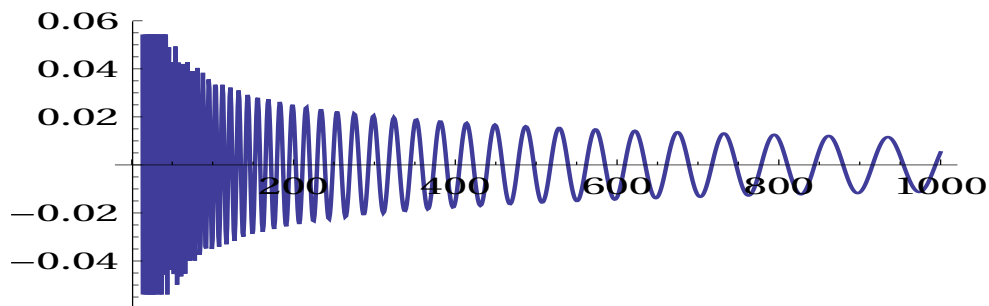


[10000]=0.0145234041256118440177
 [100000]=0.0107811168707620391727
 [1000000]=0.0111512206798152439108
 [10000000]=0.0115001989383124846728
 [100000000]=0.0114390960849727763710
 It does not converge to 0.

(77.1448 is non-trivial zero value. as it is.)

$$\sum_{n=1}^{1000} \left[\frac{\cos[(77.1448) \ln(2n-1)]}{(2n-1)^{0.5}} - \frac{\cos[(77.1448) \ln(2n)]}{(2n)^{0.5}} \right] \quad (73)$$

= 0.005230027651272115755657184376504....

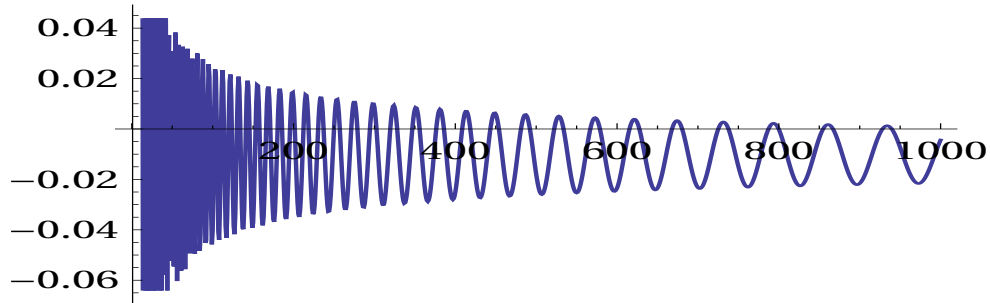


[10000]=0.0029664779953020377519
 [100000]=-0.0007006166354271297931
 [1000000]=-0.0001870419726466966779
 [10000000]=0.0001371403920681105127
 [100000000]=0.0000587154729794121019
 converge to 0.

(77.1448 +0.01=77.1548)

$$\sum_{n=1}^{1000} \left[\frac{\cos[(77.1548) \ln(2n - 1)]}{(2n - 1)^{0.5}} - \frac{\cos[(77.1548) \ln(2n)]}{(2n)^{0.5}} \right] \quad (74)$$

= -0.0043608609812712112493907874542557....

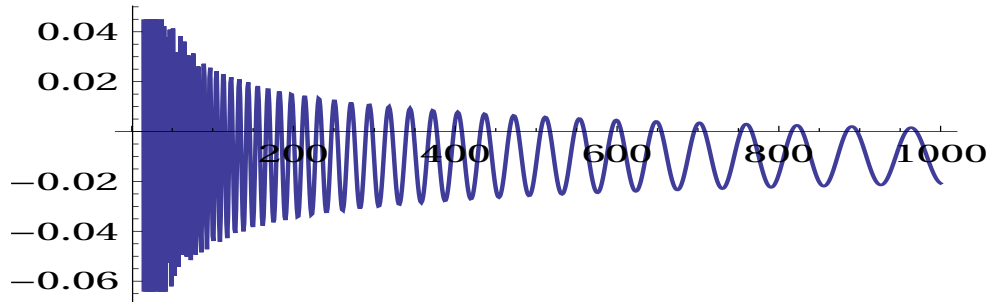


[10000]=-0.0075726021271640304999
 [100000]=-0.0111247864798120002505
 [1000000]=-0.0104739693260100571320
 [10000000]=-0.0101820675996653637468
 It does not converge to 0.

(79.3374 -0.01=79.3274)

$$\sum_{n=1}^{1000} \left[\frac{\cos[(79.3274) \ln(2n - 1)]}{(2n - 1)^{0.5}} - \frac{\cos[(79.3274) \ln(2n)]}{(2n)^{0.5}} \right] \quad (75)$$

= -0.02076513152075744354907712109053746....

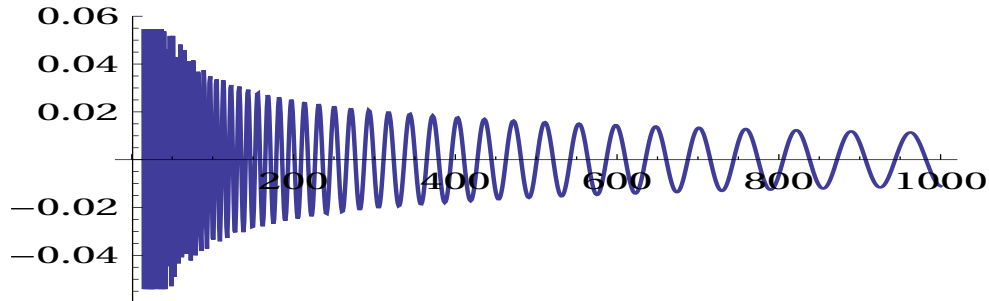


[10000]=0.0081757550311770624957
 [100000]=0.0107178805140204780333
 [1000000]=0.0113446414910911078100
 [10000000]=0.0114396706861565559260
 [100000000]=0.0114299609176478494943
 It does not converge to 0.

(79.3374 is non-trivial zero value. as it is.)

$$\sum_{n=1}^{1000} \left[\frac{\cos[(79.3374) \ln(2n-1)]}{(2n-1)^{0.5}} - \frac{\cos[(79.3374) \ln(2n)]}{(2n)^{0.5}} \right] \quad (76)$$

= -0.01106011860300484314739118389904421....

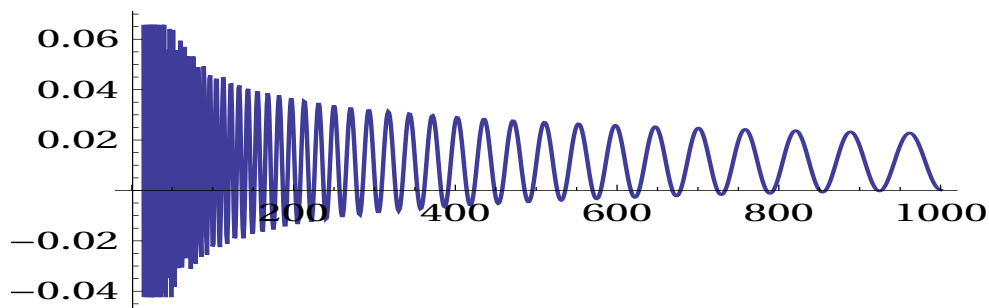


[10000]=-0.0033286483613430535924
 [100000]=-0.0007622145135349513156
 [1000000]=-0.0000828611800183551403
 [10000000]=0.0000436829234382010275
 [100000000]=0.0000471368163292867377
 converge to 0.

(79.3374 +0.01=79.3474)

$$\sum_{n=1}^{1000} \left[\frac{\cos[(79.3474) \ln(2n-1)]}{(2n-1)^{0.5}} - \frac{\cos[(79.3474) \ln(2n)]}{(2n)^{0.5}} \right] \quad (77)$$

= 0.0002394727927926906226549451014682763....

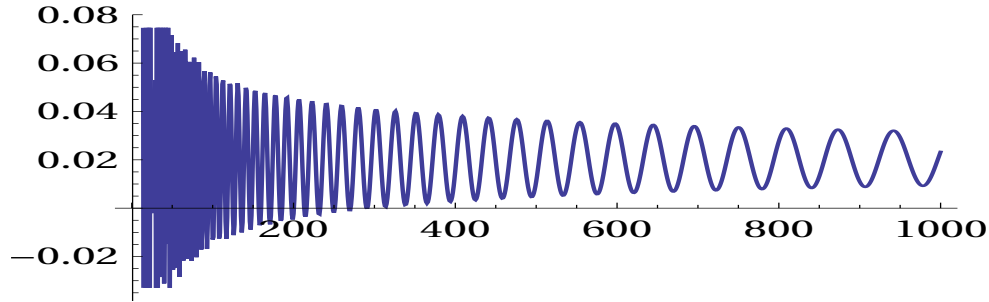


[10000]=0.0081757550311770624957
 [100000]=0.0107178805140204780333
 [1000000]=0.0113446414910911078100
 [10000000]=0.0114396706861565559260
 [100000000]=0.0114299609176478494943
 It does not converge to 0.

(82.9104 -0.01=82.9004)

$$\sum_{n=1}^{1000} \left[\frac{\cos[(82.9004) \ln(2n-1)]}{(2n-1)^{0.5}} - \frac{\cos[(82.9004) \ln(2n)]}{(2n)^{0.5}} \right] \quad (78)$$

= 0.023282073861962337559387459755070270....

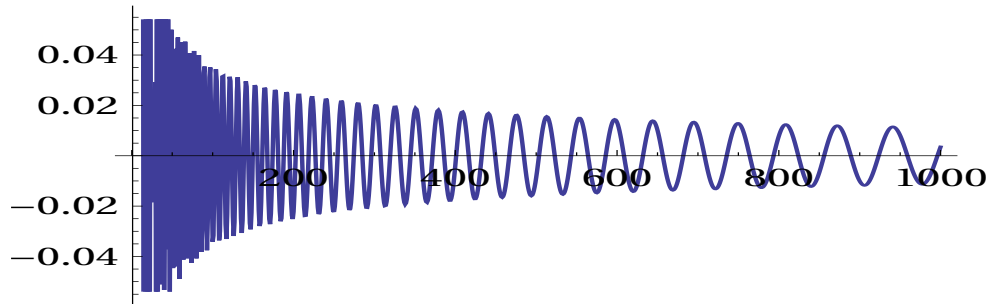


[10000]=0.0222846263592452326074
 [100000]=0.0194543229123889487020
 [1000000]=0.0208411982389801672677
 [10000000]=0.0204842003462149778448
 [100000000]=0.0205104126644407684654
 It does not converge to 0.

(82.9104 is non-trivial zero value. as it is.)

$$\sum_{n=1}^{1000} \left[\frac{\cos[(82.9104) \ln(2n-1)]}{(2n-1)^{0.5}} - \frac{\cos[(82.9104) \ln(2n)]}{(2n)^{0.5}} \right] \quad (79)$$

= 0.00353445588698973299308904117790351....

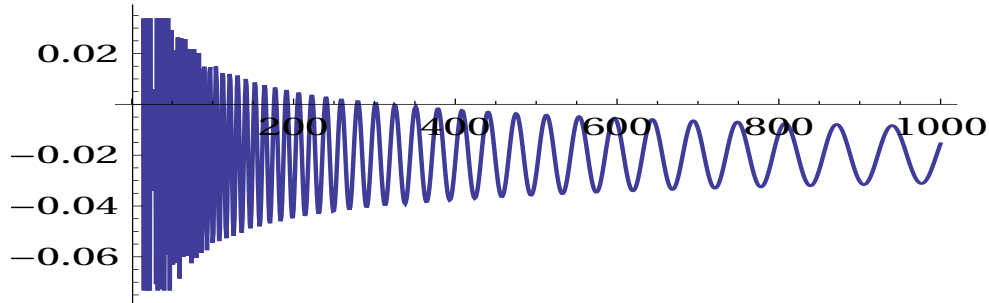


[10000]=0.0014103623601796036642
 [100000]=-0.0010605598122671972775
 [1000000]=0.0002978867961682382442
 [10000000]=-0.0000952393762674968021
 [100000000]=-0.0000456358162302138902
 converge to 0.

(82.9104 +0.01=82.9204)

$$\sum_{n=1}^{1000} \left[\frac{\cos[(82.9204) \ln(2n-1)]}{(2n-1)^{0.5}} - \frac{\cos[(82.9204) \ln(2n)]}{(2n)^{0.5}} \right] \quad (80)$$

= -0.0154899634910662258389046813497956....

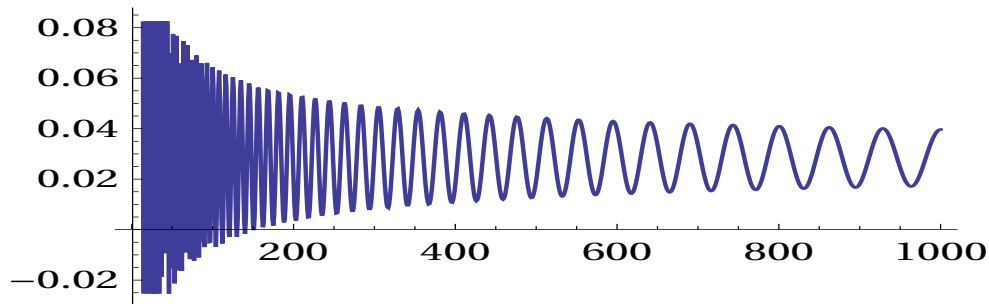


[10000]=-0.0187342688547805988342
 [100000]=-0.0208164032433105182507
 [1000000]=-0.0195086635481445599960
 [10000000]=-0.0199292508559919707978
 It does not converge to 0.

(84.7355 -0.01=84.7255)

$$\sum_{n=1}^{1000} \left[\frac{\cos[(84.7255) \ln(2n-1)]}{(2n-1)^{0.5}} - \frac{\cos[(84.7255) \ln(2n)]}{(2n)^{0.5}} \right] \quad (81)$$

= 0.0396645733911028256955546774667570504....

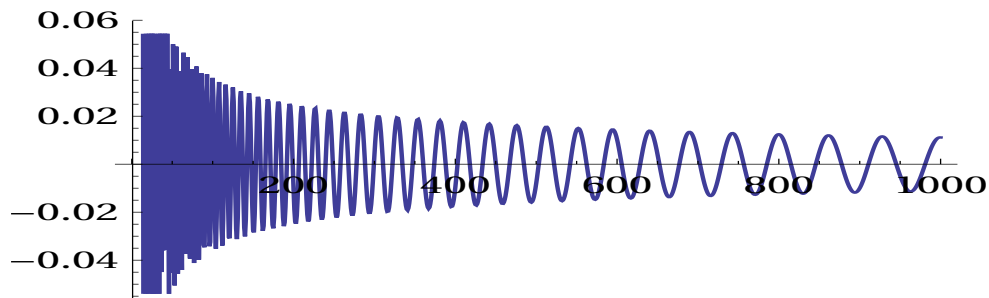


[10000]=0.0318872204225595853866
 [100000]=0.0294184557494009089884
 [1000000]=0.0287067629290724581070
 [10000000]=0.0285249567043578157455
 [100000000]=0.0284865943793785082738
 It does not converge to 0.

(84.7355 is nontrivial zero value. as it is.)

$$\sum_{n=1}^{1000} \left[\frac{\cos[(84.7355) \ln(2n-1)]}{(2n-1)^{0.5}} - \frac{\cos[(84.7355) \ln(2n)]}{(2n)^{0.5}} \right] \quad (82)$$

= 0.01114105160265642993787875398772657....

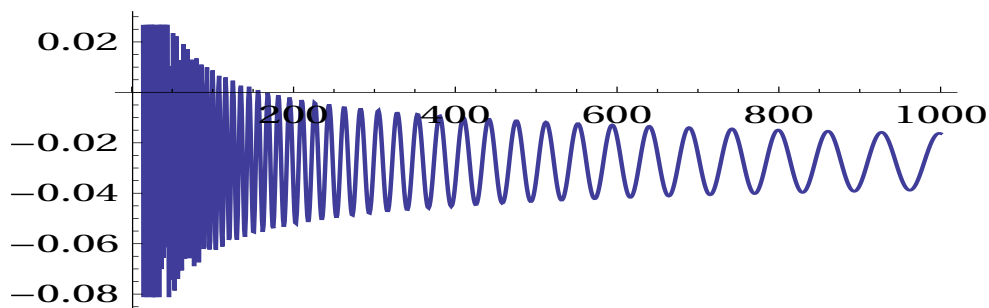


[10000]=0.0032716683727916544625
 [100000]=0.0008326779381843932206
 [1000000]=0.0001606701190157385807
 [10000000]=0.0000029354452761063156
 [100000000]=-0.0000241664658097951197
 converge to 0.

(84.7355 +0.01=84.7455)

$$\sum_{n=1}^{1000} \left[\frac{\cos[(84.7455) \ln(2n-1)]}{(2n-1)^{0.5}} - \frac{\cos[(84.7455) \ln(2n)]}{(2n)^{0.5}} \right] \quad (83)$$

= -0.01634507197229332832488362753685614....

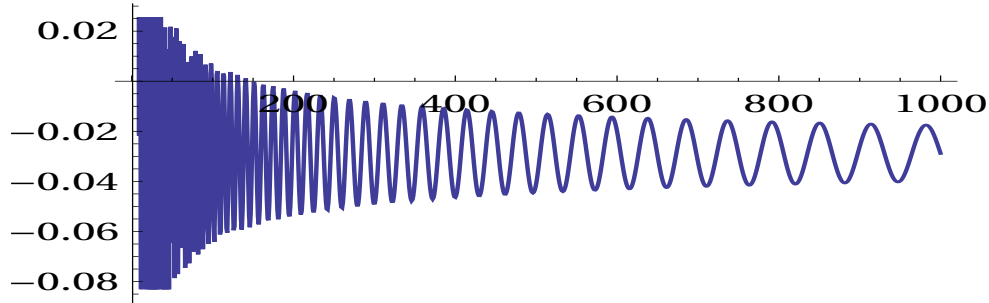


[10000]=-0.0242742873721646205964
 [100000]=-0.0266639316485210234320
 [1000000]=-0.0272873605024068974223
 [10000000]=-0.0274178711569532593262
 [100000000]=-0.0274329111587670940176
 It does not converge to 0.

(87.4253 -0.01=87.4153)

$$\sum_{n=1}^{1000} \left[\frac{\cos[(87.4153) \ln(2n-1)]}{(2n-1)^{0.5}} - \frac{\cos[(87.4153) \ln(2n)]}{(2n)^{0.5}} \right] \quad (84)$$

= -0.028868238867705496470309995403830767....



[10000]=-0.0294905492735248811464

[100000]=-0.0292174614920240223459

[1000000]=-0.0289672758022459127247

[10000000]=-0.0288395349215854295000

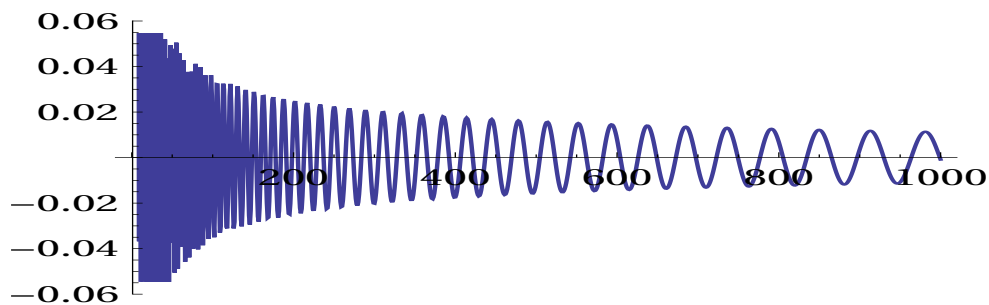
[100000000]=-0.0287856788587947144686

It does not converge to 0.

(87.4253 is non-trivial zero value. as it is.)

$$\sum_{n=1}^{1000} \left[\frac{\cos[(87.4253) \ln(2n-1)]}{(2n-1)^{0.5}} - \frac{\cos[(87.4253) \ln(2n)]}{(2n)^{0.5}} \right] \quad (85)$$

= -0.0008885814873853968282314147822626937....



[10000]= -0.0010004497393000491741

[100000]= -0.0005095242227744967893

[1000000]= -0.0001774559399960536792

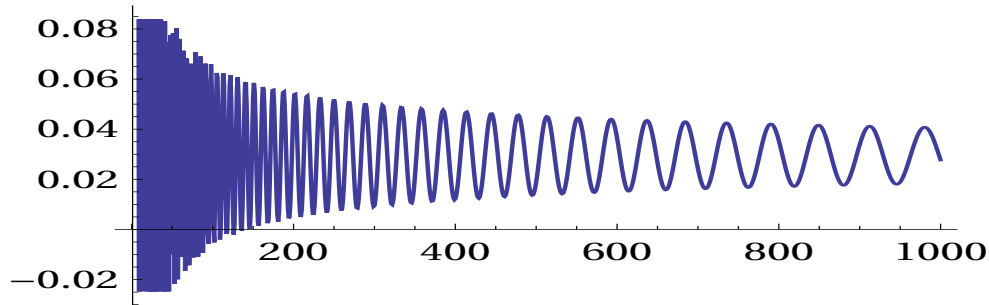
[10000000]= -0.0000220674631672737237

converge to 0.

(87.4253 +0.01=87.4353)

$$\sum_{n=1}^{1000} \left[\frac{\cos[(87.4353) \ln(2n-1)]}{(2n-1)^{0.5}} - \frac{\cos[(87.4353) \ln(2n)]}{(2n)^{0.5}} \right] \quad (86)$$

= 0.02770447484589880891303818419140328....

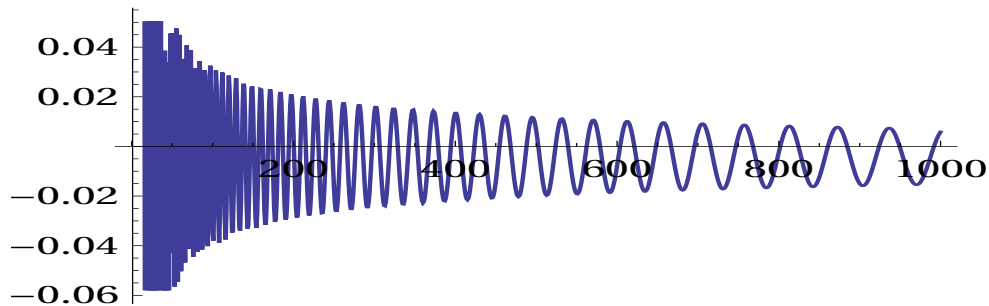


[10000]=0.0281080194080228738807
 [100000]=0.0288149360292453242394
 [1000000]=0.0292254876163264634692
 [10000000]=0.0294059482673889455162
 [100000000]=0.0294750496713673745819
 It does not converge to 0.

(88.8091 -0.01=88.7991)

$$\sum_{n=1}^{1000} \left[\frac{\cos[(88.7991) \ln(2n-1)]}{(2n-1)^{0.5}} - \frac{\cos[(88.7991) \ln(2n)]}{(2n)^{0.5}} \right] \quad (87)$$

= 0.00585253027583306986688681062022843....

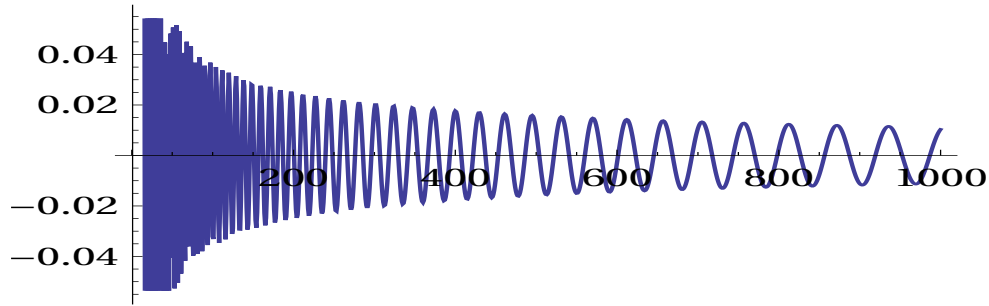


[10000]=-0.0075802629627276293250
 [100000]=-0.0030150819828270061622
 [1000000]=-0.0044697337538711374300
 [10000000]=-0.0040379390189374331568
 [100000000]=-0.0041561060838526033695
 It does not converge to 0.

(88.8091 is non-trivial zero value. as it is.)

$$\sum_{n=1}^{1000} \left[\frac{\cos[(88.8091) \ln(2n-1)]}{(2n-1)^{0.5}} - \frac{\cos[(88.8091) \ln(2n)]}{(2n)^{0.5}} \right] \quad (88)$$

= 0.0103328970781082668980115307749628....

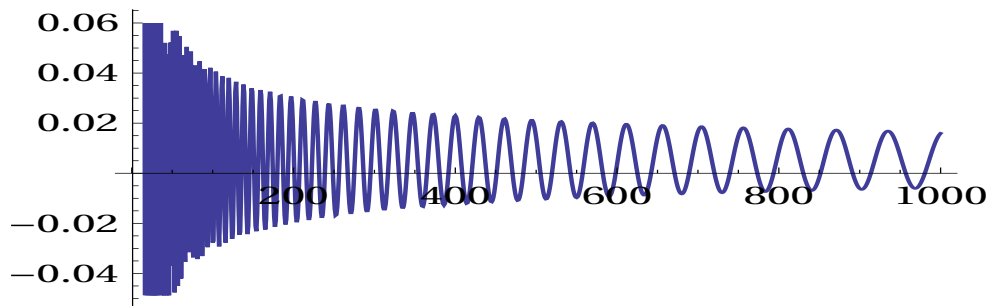


[10000]= -0.0035136809338557582760
 [100000]= 0.0010982711272328137507
 [1000000]= -0.0003239705664555260706
 [10000000]= 0.0000776637060144497345
 [100000000]= -0.0000237365082598473473
 converge to 0.

(88.8091 +0.01=88.8191)

$$\sum_{n=1}^{1000} \left[\frac{\cos[(88.8191) \ln(2n-1)]}{(2n-1)^{0.5}} - \frac{\cos[(88.8191) \ln(2n)]}{(2n)^{0.5}} \right] \quad (89)$$

= 0.01593493283752298348725610077429899....

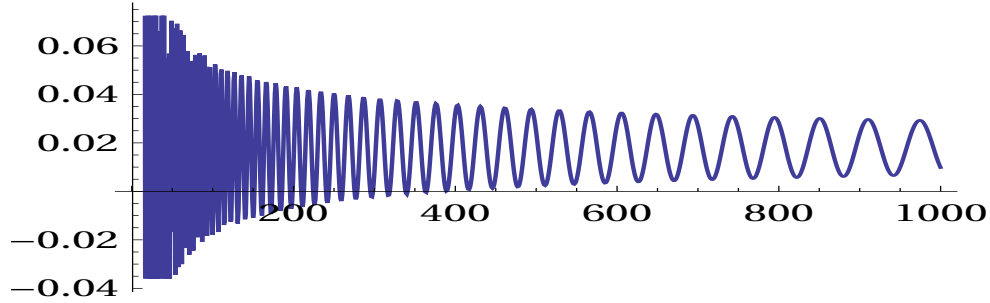


[10000]=0.0017686547806949515400
 [100000]=0.0063765745429264107311
 [1000000]=0.0050098608074647396973
 [10000000]=0.0053722992267073851544
 [100000000]=0.0052906766583897986422
 It does not converge to 0.

(92.4919 - 0.01 = 92.4819)

$$\sum_{n=1}^{1000} \left[\frac{\cos[(92.4819) \ln(2n-1)]}{(2n-1)^{0.5}} - \frac{\cos[(92.4819) \ln(2n)]}{(2n)^{0.5}} \right] \quad (90)$$

= 0.0098019674300467981702972710862591060....

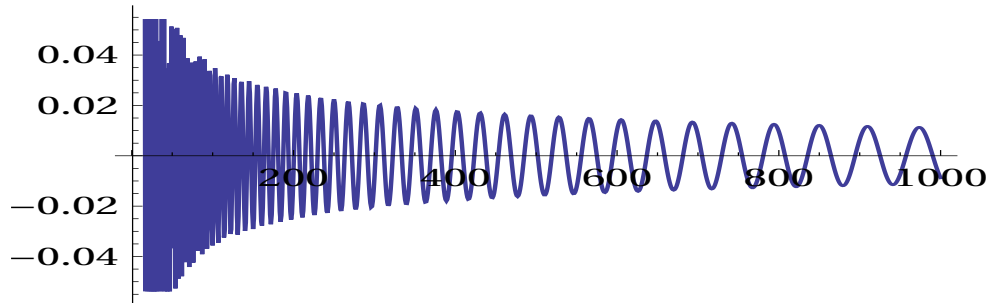


[10000]=0.0175727899371627450942
 [100000]=0.0185962823074991082106
 [1000000]=0.0183356254448237623866
 [10000000]=0.0181058644958792085145
 [100000000]=0.0180190368161497645183
 It does not converge to 0.

(92.4919 is nontrivial zero value. as it is.)

$$\sum_{n=1}^{1000} \left[\frac{\cos[(92.4919) \ln(2n-1)]}{(2n-1)^{0.5}} - \frac{\cos[(92.4919) \ln(2n)]}{(2n)^{0.5}} \right] \quad (91)$$

0.008547365010250874501406981302547....

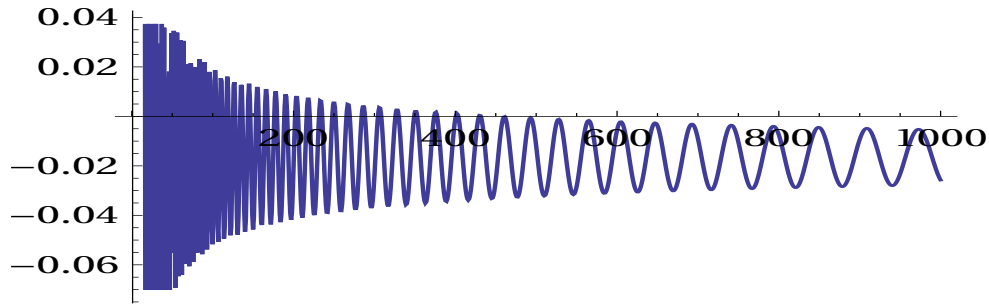


[10000]= -0.0007743076968254169329
 [100000]= 0.0004744262043307513350
 [1000000]= 0.0003134308227507082872
 [10000000]= 0.0001086453122232273349
 [100000000]= 0.0000222759238317110844
 converge to 0.

(92.4919 +0.01=92.5019)

$$\sum_{n=1}^{1000} \left[\frac{\cos[(92.5019) \ln(2n-1)]}{(2n-1)^{0.5}} - \frac{\cos[(92.5019) \ln(2n)]}{(2n)^{0.5}} \right] \quad (92)$$

= -0.025769922882814007897222100511552408....



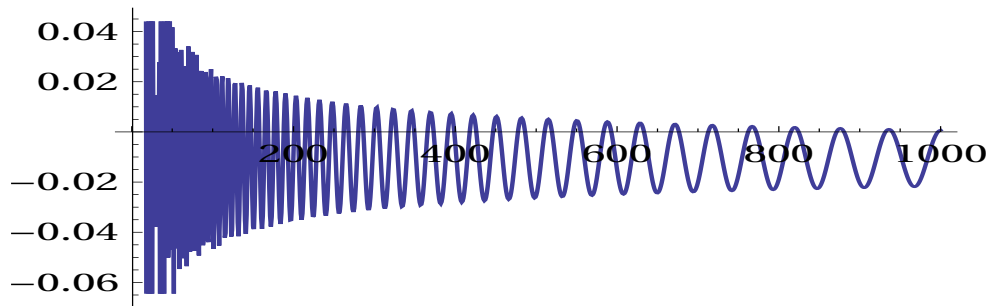
[10000]=-0.0176244246733206419431
 [100000]=-0.0161651034310129684823
 [1000000]=-0.0162259716204928086669
 [10000000]=-0.0164022678319018025417
 [100000000]=-0.0164859373527452453264

It does not converge to 0.

(The axis is 94.6513 -0.01=94.6413)

$$\sum_{n=1}^{1000} \left[\frac{\cos[(94.6413) \ln(2n-1)]}{(2n-1)^{0.5}} - \frac{\cos[(94.6413) \ln(2n)]}{(2n)^{0.5}} \right] \quad (93)$$

= 0.000660819168786540468218909859131396....



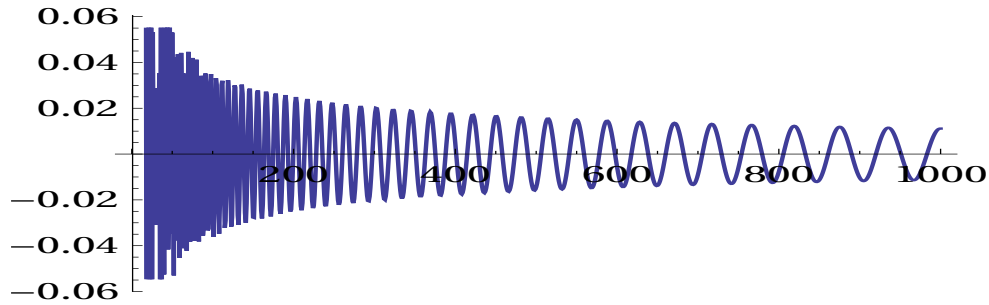
[10000]=-0.0121569785214179423849
 [100000]=-0.0112000894592297842861
 [1000000]=-0.0101682718652411838156
 [10000000]=-0.0105313846942306915677
 [100000000]=-0.0105406836417775116865

It does not converge to 0.

(94.6513 is non-trivial zero value as it is.)

$$\sum_{n=1}^{1000} \left[\frac{\cos[(94.6513) \ln(2n-1)]}{(2n-1)^{0.5}} - \frac{\cos[(94.6513) \ln(2n)]}{(2n)^{0.5}} \right] \quad (94)$$

= 0.011127005476330245290336596568709....

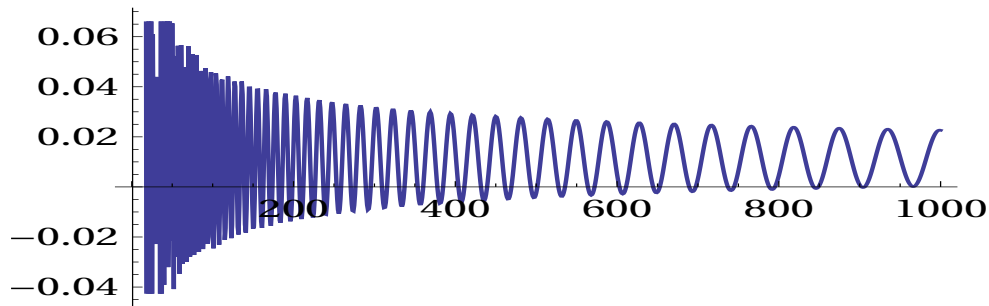


[10000]= -0.0013765254567662944633
 [100000]= -0.0008392212363509909913
 [1000000]= 0.0002788508501267524431
 [10000000]= -0.0000497038044914837129
 [100000000]= -0.0000309521760194209424
 converge to 0.

(94.6513 +0.01=94.6613)

$$\sum_{n=1}^{1000} \left[\frac{\cos[(94.6613) \ln(2n-1)]}{(2n-1)^{0.5}} - \frac{\cos[(94.6613) \ln(2n)]}{(2n)^{0.5}} \right] \quad (95)$$

= 0.0226177350640789660336991357925295....

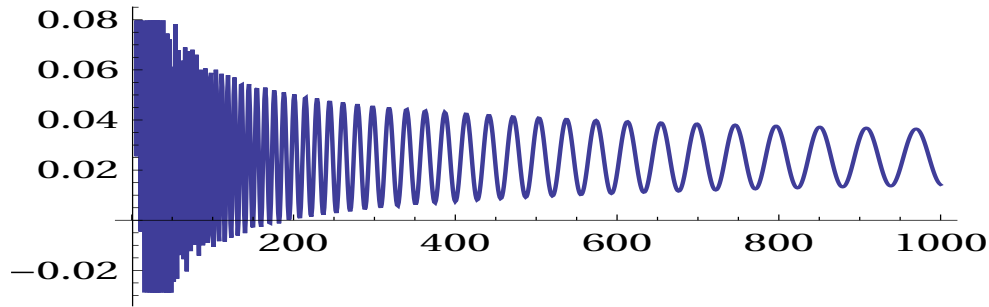


[10000]=0.0105060236444533584843
 [100000]=0.0106224946041767430438
 [1000000]=0.0118081762350637931719
 [10000000]=0.0115210923270080024122
 [100000000]=0.0114690425146854717980
 not converge

(95.8706 -0.01=95.8606)

$$\sum_{n=1}^{1000} \left[\frac{\cos[(95.8606) \ln(2n-1)]}{(2n-1)^{0.5}} - \frac{\cos[(95.8606) \ln(2n)]}{(2n)^{0.5}} \right] \quad (96)$$

= 0.0141726314708569701042096332852576....

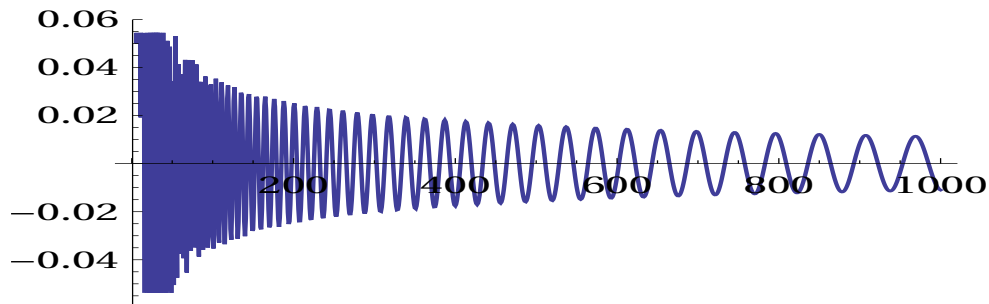


[10000]=0.0222087165335923750198
 [100000]=0.0249554363954456182029
 [1000000]=0.0253503637991626534776
 [10000000]=0.0252465303669947294107
 [100000000]=0.0251620072925927106000
 It does not converge to 0.

(95.8706 non-trivial zero value. as it is.)

$$\sum_{n=1}^{1000} \left[\frac{\cos[(95.8706) \ln(2n-1)]}{(2n-1)^{0.5}} - \frac{\cos[(95.8706) \ln(2n)]}{(2n)^{0.5}} \right] \quad (97)$$

= -0.011014033824321856717273464621484....

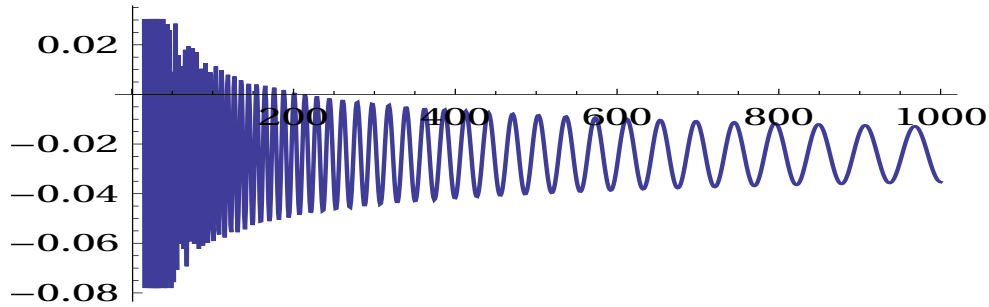


[10000]= -0.0026317155444329789170
 [100000]= 0.0000402283252831486376
 [1000000]= 0.0003377731160845019081
 [10000000]= 0.0001959498109393056735
 [100000000]= 0.0001062174084937451399
 converge to 0.

(95.8706 +0.01=95.8806)

$$\sum_{n=1}^{1000} \left[\frac{\cos[(95.8806) \ln(2n-1)]}{(2n-1)^{0.5}} - \frac{\cos[(95.8806) \ln(2n)]}{(2n)^{0.5}} \right] \quad (98)$$

= -0.0353349835789649803594929182725300....

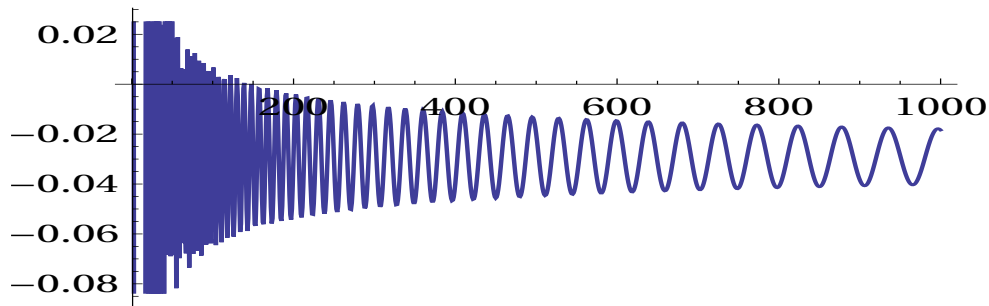


[10000]=-0.0266439074358246347218
 [100000]=-0.0240727000624901266157
 [1000000]=-0.0238785193788296559725
 [10000000]=-0.0240561535769304446486
 [100000000]=-0.0241487448061668240340
 It does not converge to 0.

(98.8312 -0.01=98.8212)

$$\sum_{n=1}^{1000} \left[\frac{\cos[(98.8212) \ln(2n-1)]}{(2n-1)^{0.5}} - \frac{\cos[(98.8212) \ln(2n)]}{(2n)^{0.5}} \right] \quad (99)$$

= -0.01836716410892171545340072825816205....

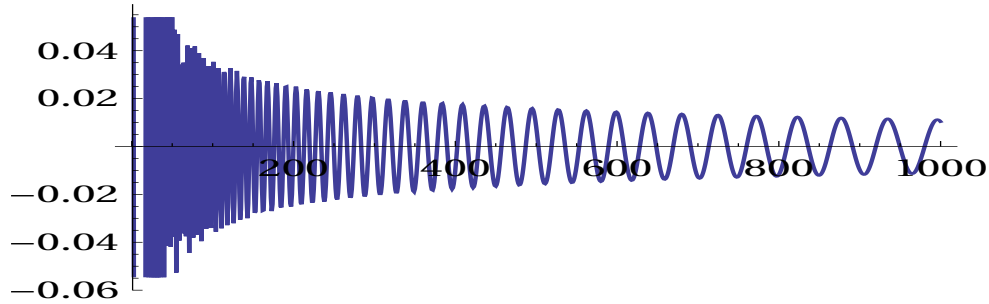


[10000]=-0.0292518955508751753170
 [100000]=-0.0301065407422408601312
 [1000000]=-0.0291306835944684996975
 [10000000]=-0.0289089284578080280008
 [100000000]=-0.0289757311462570422977
 It does not converge to 0.

(98.8312 non-trivial zero value. as it is.)

$$\sum_{n=1}^{1000} \left[\frac{\cos[(98.8312) \ln(2n-1)]}{(2n-1)^{0.5}} - \frac{\cos[(98.8312) \ln(2n)]}{(2n)^{0.5}} \right] \quad (100)$$

= 0.01035763665582629861002788662670953735774....

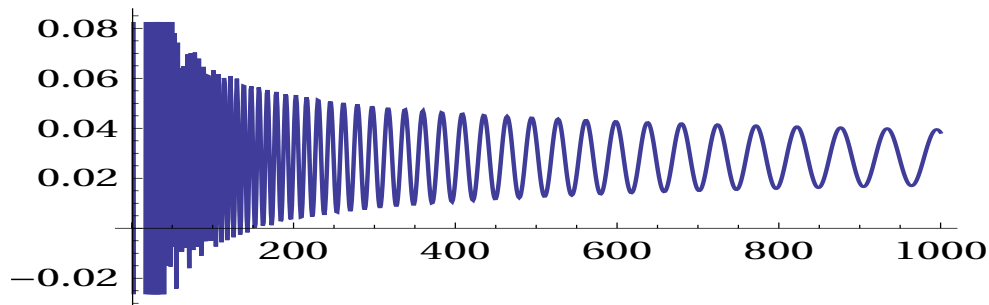


[10000]=-0.0005812758455654100289
 [100000]=-0.0011009283190770852157
 [1000000]=-0.0000636630925465695460
 [10000000]=0.0001183386232722523221
 [100000000]=0.0000372821209876205499
 converge to 0.

(98.8312 +0.01=98.8412)

$$\sum_{n=1}^{1000} \left[\frac{\cos[(98.8412) \ln(2n-1)]}{(2n-1)^{0.5}} - \frac{\cos[(98.8412) \ln(2n)]}{(2n)^{0.5}} \right] \quad (101)$$

= 0.038336463236695226503961208870407837....



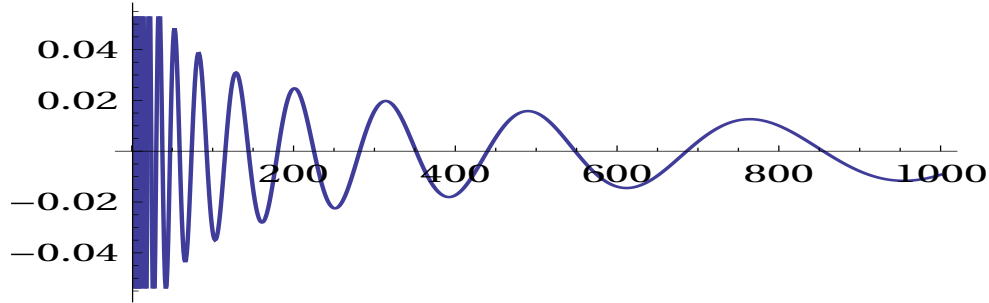
[10000]=0.0274089479801120014524
 [100000]=0.0272350581913820416480
 [1000000]=0.0283187887816494579529
 [10000000]=0.0284564818222056009622
 [100000000]=0.0283632866205242029078
 It does not converge to 0.

Chapter 2

(The axis is 0.5 -0.0001)

$$\sum_{n=1}^{1000} \left[\frac{\cos[(14.1347) \ln(2n-1)]}{(2n-1)^{0.4999}} - \frac{\cos[(14.1347) \ln(2n)]}{(2n)^{0.4999}} \right] \quad (102)$$

= -0.009257840509601691345415572118652270020349....

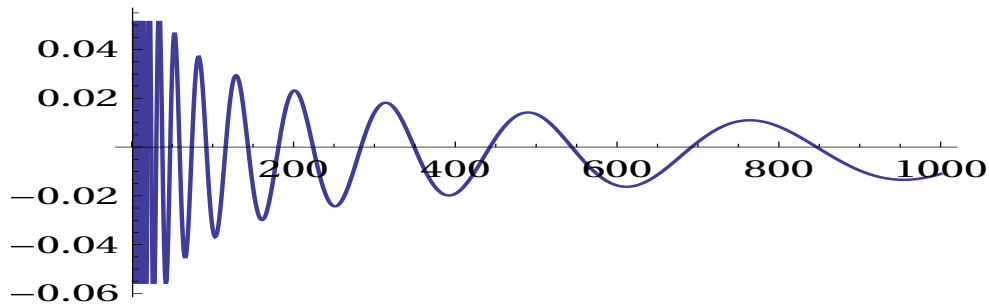


[10000] = 0.0004507987473490796242
 [100000] = 0.0008914259539826629910
 [1000000] = 0.0000369560416503415042
 [10000000] = -0.0002376640949813201248
 It does not converge to 0.

(The axis is 0.5 -0.001)

$$\sum_{n=1}^{1000} \left[\frac{\cos[(14.1347) \ln(2n-1)]}{(2n-1)^{0.499}} - \frac{\cos[(14.1347) \ln(2n)]}{(2n)^{0.499}} \right] \quad (103)$$

= -0.01101289662827007626840667504580326470803....

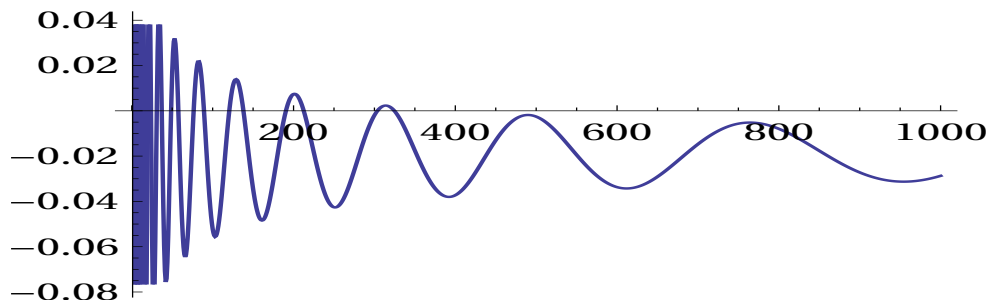


[10000] = -0.0012362724913637813257
 [100000] = -0.0007894351938749065867
 [1000000] = -0.0016528658873606642214
 [10000000] = -0.0019311939413460994797
 It does not converge to 0.

(The axis is 0.5 -0.01)

$$\sum_{n=1}^{1000} \left[\frac{\cos[(14.1347) \ln(2n - 1)]}{(2n - 1)^{0.49}} - \frac{\cos[14.1347 \ln(2n)]}{(2n)^{0.49}} \right] \quad (104)$$

= -0.0287246146425618261....



[10000]= -0.0182412463962976847953

[100000]= -0.0177277053736920320315

[1000000]= -0.0186860009565473737803

[10000000]= -0.0190042870176894175549

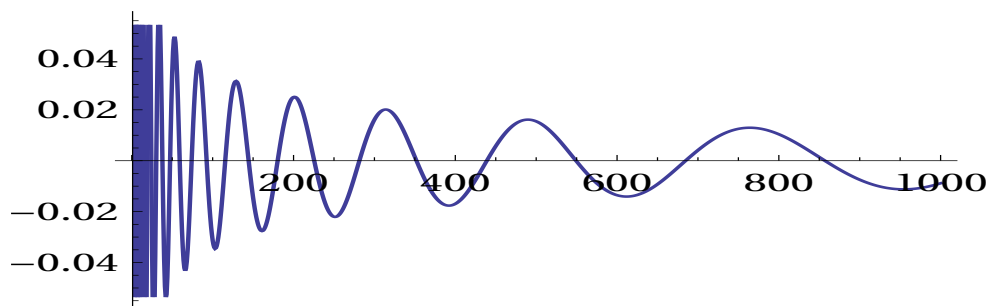
[100000000]= -0.0189917517130979707218

It does not converge to 0.

(The axis is 0.5 as it is.)

$$\sum_{n=1}^{1000} \left[\frac{\cos[(14.1347) \ln(2n - 1)]}{(2n - 1)^{0.5}} - \frac{\cos[14.1347 \ln(2n)]}{(2n)^{0.5}} \right] \quad (105)$$

-0.00906301367133582151....



[10000]=0.0006381011115495365026

[100000]=0.0010780432416684295090

[1000000]=0.0002245632899122298001

[10000000]= -0.0000496479275200912434

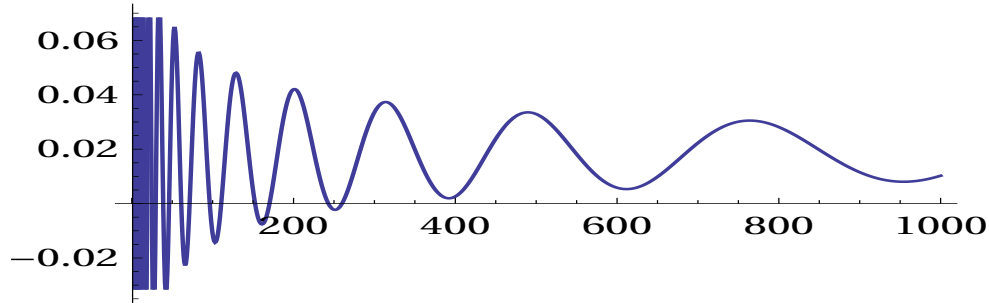
[100000000]= -0.0000382288508812898928

converge to 0.

(The axis is 0.5 +0.01)

$$\sum_{n=1}^{1000} \left[\frac{\cos[(14.1347) \ln(2n - 1)]}{(2n - 1)^{0.51}} - \frac{\cos[14.1347 \ln(2n)]}{(2n)^{0.51}} \right] \quad (106)$$

= 0.01024008264902787325....



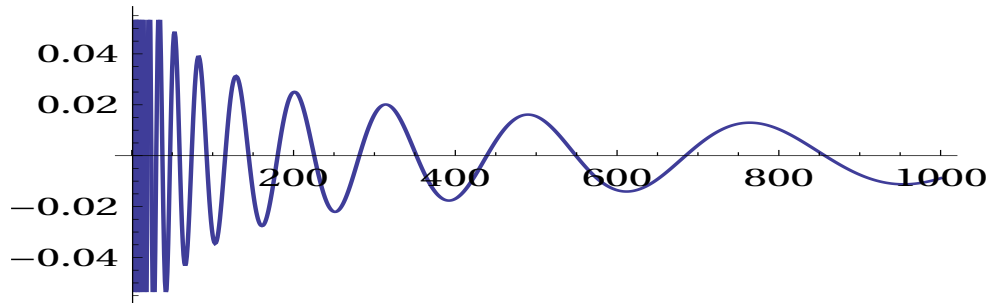
[10000]=0.0192176082247373404555
 [100000]=0.0195937840748259088641
 [1000000]=0.0188337913412248876555
 [10000000]=0.0185975339572469408611
 [100000000]=0.0186078662584906844024

It does not converge to 0.

(The axis is 0.5 +0.0001)

$$\sum_{n=1}^{1000} \left[\frac{\cos[(14.1347) \ln(2n - 1)]}{(2n - 1)^{0.5001}} - \frac{\cos[(14.1347) \ln(2n)]}{(2n)^{0.5001}} \right] \quad (107)$$

= -0.008868222680406964769889406332068608994503



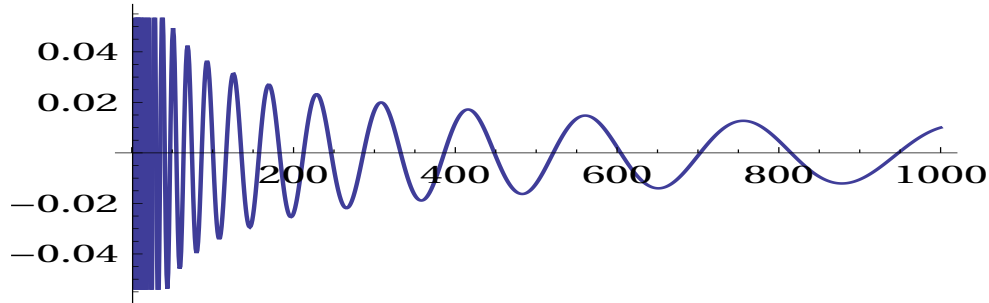
[10000] =0.0008253734918036038232
 [100000] =0.0012646315271827121996
 [1000000] =0.0004121404043212865422
 [10000000] =0.0001383374951391049966
 [100000000] =0.0001497455169634955138

It does not converge to 0.

(The axis is 0.5 -0.0001)

$$\sum_{n=1}^{1000} \left[\frac{\cos[(21.022) \ln(2n-1)]}{(2n-1)^{0.4999}} - \frac{\cos[(21.022) \ln(2n)]}{(2n)^{0.4999}} \right] \quad (108)$$

$$= 0.0100019320932391061671948202460068179705347856$$



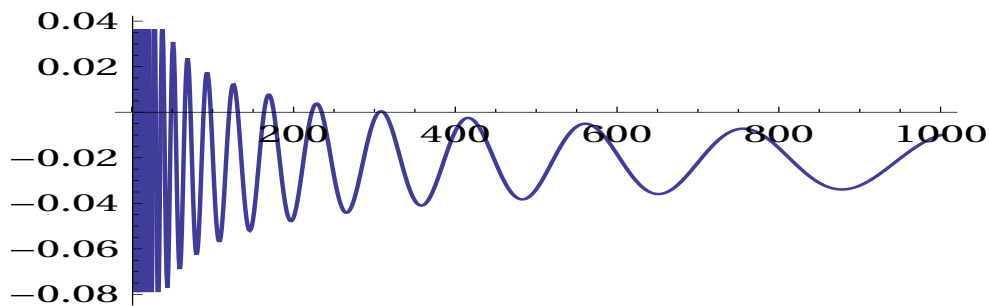
[10000]= -0.0025130531442483245580
 [100000]= -0.0007592596129060642015
 [1000000]= 0.0001734116036285227871
 [10000000]= -0.0001707549672368732893
 [100000000]= -0.0002018563265390039933

It does not converge to 0.

(The axis is 0.5 -0.01)

$$\sum_{n=1}^{1000} \left[\frac{\cos[(21.022) \ln(2n-1)]}{(2n-1)^{0.49}} - \frac{\cos[(21.022) \ln(2n)]}{(2n)^{0.49}} \right] \quad (109)$$

$$= -0.01007762395769285143879846010508521258263033846$$



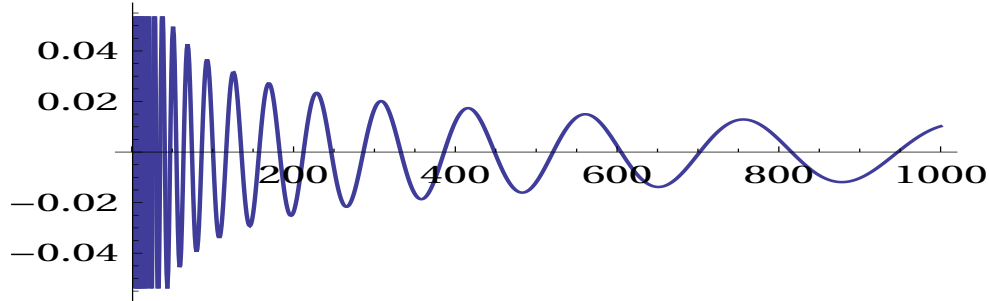
[10000]=-0.0236290071420571581862
 [100000]=-0.0217095847284566982605
 [1000000]=-0.0206482298290876220559
 [10000000]=-0.0210456267984390245351
 [100000000]=-0.0210832778695941719382

It does not converge to 0.

(The axis is 0.5 as it is.)

$$\sum_{n=1}^{1000} \left[\frac{\cos[(21.022) \ln(2n - 1)]}{(2n - 1)^{0.5}} - \frac{\cos[(21.022) \ln(2n)]}{(2n)^{0.5}} \right] \quad (110)$$

$$= 0.010203050972979707561650919065336067554566938594$$

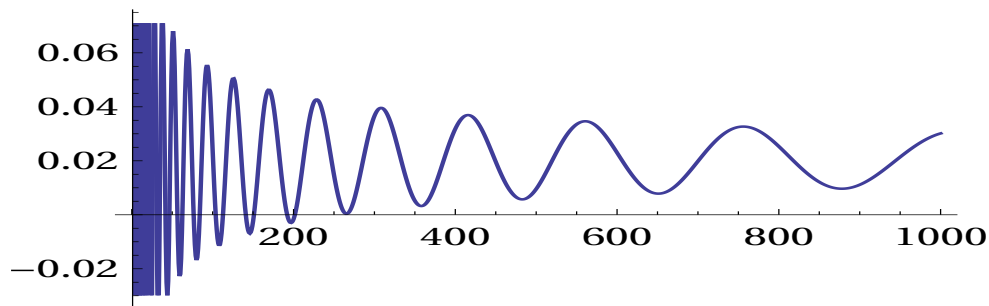


[10000]=-0.0023018856406172511289
 [100000]=-0.0005496921657573621087
 [1000000]=0.0003817627764431225329
 [10000000]=0.0000380957809653702473
 [100000000]=0.0000070544092957442871
 converge to 0.

(The axis is 0.5 +0.01)

$$\sum_{n=1}^{1000} \left[\frac{\cos[(21.022) \ln(2n - 1)]}{(2n - 1)^{0.51}} - \frac{\cos[(21.022) \ln(2n)]}{(2n)^{0.51}} \right] \quad (111)$$

$$= 0.03014372506605197837618899656595194588614842701$$

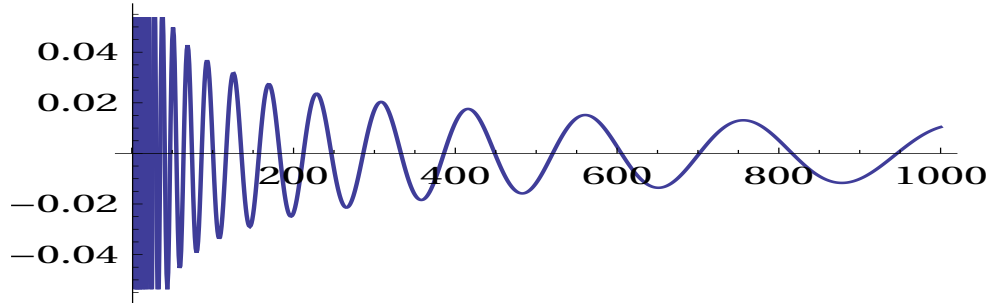


[10000]=0.0186034964827524601505
 [100000)=0.0202026487431074264212
 [1000000]=0.0210202028664549234183
 [10000000]=0.0207230001134234807780
 [100000000]=0.0206974093289953205155
 It does not converge to 0.

(The axis is 0.5 +0.0001)

$$\sum_{n=1}^{1000} \left[\frac{\cos[(21.022) \ln(2n-1)]}{(2n-1)^{0.5001}} - \frac{\cos[(21.022) \ln(2n)]}{(2n)^{0.5001}} \right] \quad (112)$$

$$= 0.01040413585093161542948171527344683833200$$

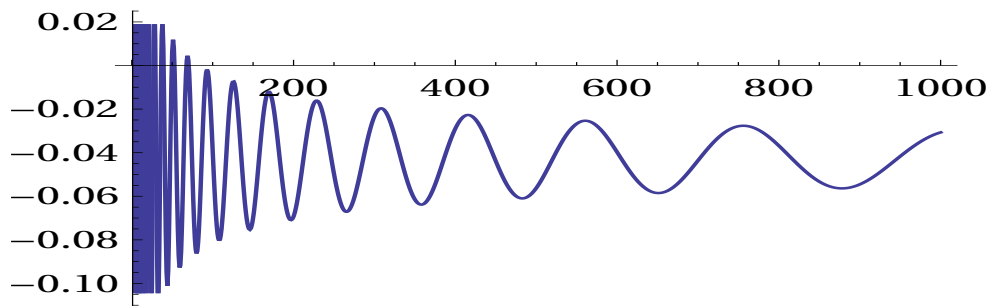


[10000]= -0.0020907603079233774354
 [100000]= -0.0003401654715591180544
 [1000000]= 0.0005900747938683002011
 [10000000]= 0.0002469066484824651792
 [100000000]= 0.0002159251488904244615
 It does not converge to 0.

(The axis is 0.5 -0.02)

$$\sum_{n=1}^{1000} \left[\frac{\cos[(21.022) \ln(2n-1)]}{(2n-1)^{0.48}} - \frac{\cos[(21.022) \ln(2n)]}{(2n)^{0.48}} \right] \quad (113)$$

$$= -0.03070111267169493669615238336936340134803$$

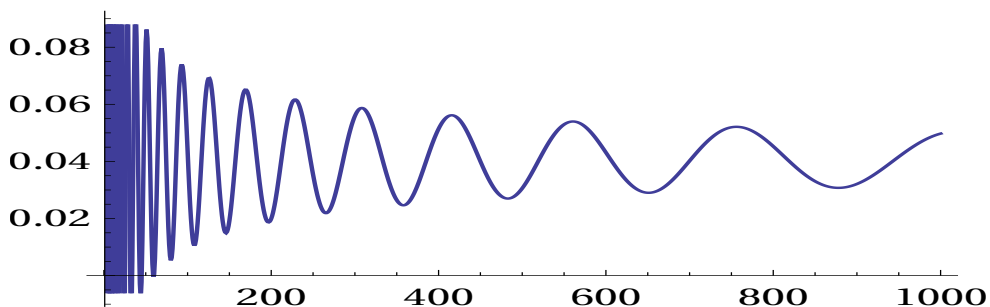


(calculation is omitted)

(The axis is 0.5 +0.02)

$$\sum_{n=1}^{1000} \left[\frac{\cos[(21.022) \ln(2n-1)]}{(2n-1)^{0.52}} - \frac{\cos[(21.022) \ln(2n)]}{(2n)^{0.52}} \right] \quad (114)$$

= 0.01040413585093161542948171527344683833200

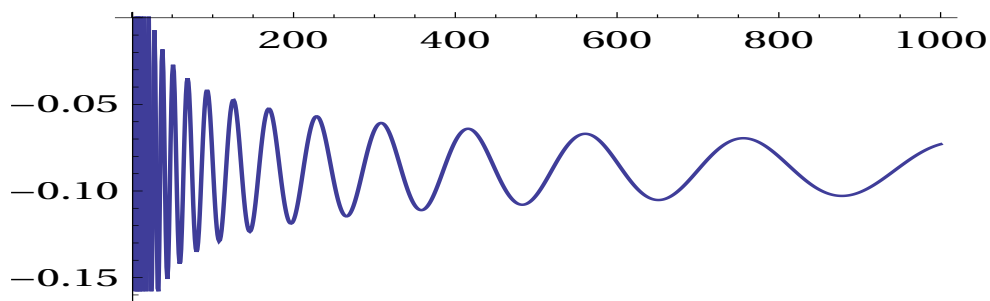


(calculation is omitted)

(The axis is 0.5 -0.04)

$$\sum_{n=1}^{1000} \left[\frac{\cos[(21.022) \ln(2n-1)]}{(2n-1)^{0.46}} - \frac{\cos[(21.022) \ln(2n)]}{(2n)^{0.46}} \right] \quad (115)$$

= -0.07298661059381196497204117045350103709776

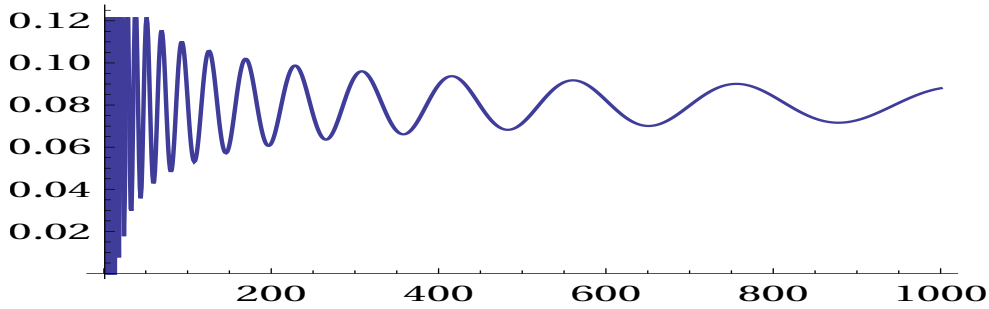


(calculation is omitted)

(The axis is 0.5 +0.04)

$$\sum_{n=1}^{1000} \left[\frac{\cos[(21.022) \ln(2n-1)]}{(2n-1)^{0.54}} - \frac{\cos[(21.022) \ln(2n)]}{(2n)^{0.54}} \right] \quad (116)$$

$$= 0.08795681187328022067573686113169838407802$$

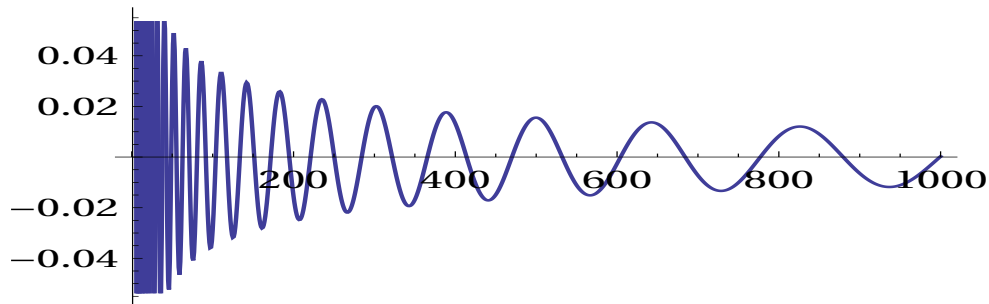


(calculation is omitted)

(The axis is 0.5 -0.0001)

$$\sum_{n=1}^{1000} \left[\frac{\cos[(25.0108) \ln(2n-1)]}{(2n-1)^{0.4999}} - \frac{\cos[(25.0108) \ln(2n)]}{(2n)^{0.4999}} \right] \quad (117)$$

$$= 0.0002340683951231753530213741769410219031263$$



$$[10000] = 0.0028566554290930883629$$

$$[100000] = 0.0006906044201284139818$$

$$[1000000] = -0.0002709625732176824389$$

$$[10000000] = -0.0003618649905174442603$$

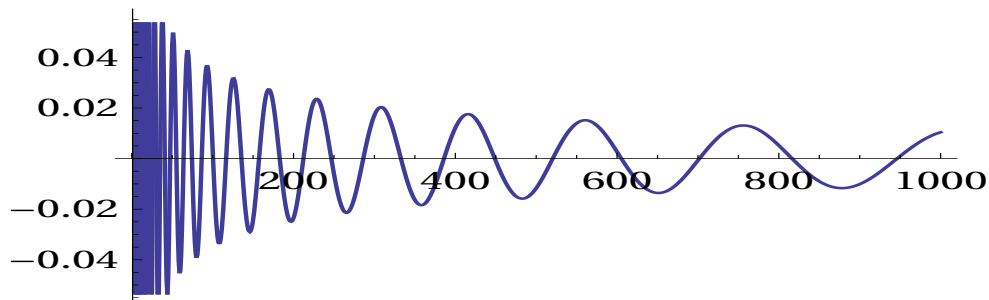
$$[100000000] = -0.0002947302460572199471$$

It does not converge to 0.

(The axis is 0.5 as it is.)

$$\sum_{n=1}^{1000} \left[\frac{\cos[(25.0108) \ln(2n-1)]}{(2n-1)^{0.5}} - \frac{\cos[(25.0108) \ln(2n)]}{(2n)^{0.5}} \right] \quad (118)$$

$$= 0.000416329417915032594395358125814297943316$$

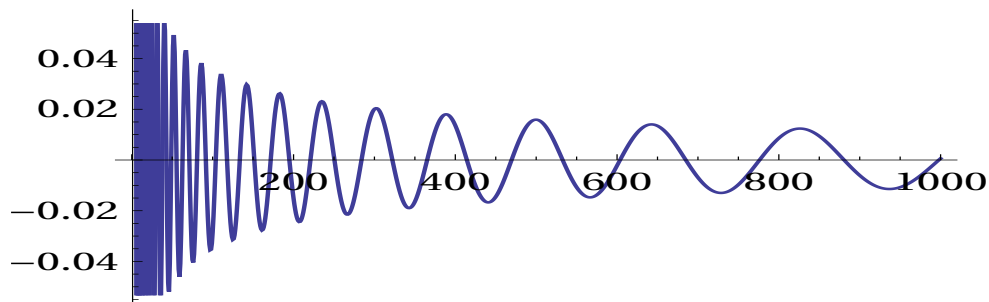


[10000]= 0.0030362058419032560315
 [100000]= 0.0008720793230033872714
 [1000000]= -0.0000883131280091895720
 [10000000]= -0.0001790612933318289318
 [100000000]= -0.0001120322912827072107
 converge to 0.

(The axis is 0.5 +0.0001)

$$\sum_{n=1}^{1000} \left[\frac{\cos[(25.0108) \ln(2n-1)]}{(2n-1)^{0.5001}} - \frac{\cos[(25.0108) \ln(2n)]}{(2n)^{0.5001}} \right] \quad (119)$$

$$= 0.0005985544783954206970746192803864414197669$$

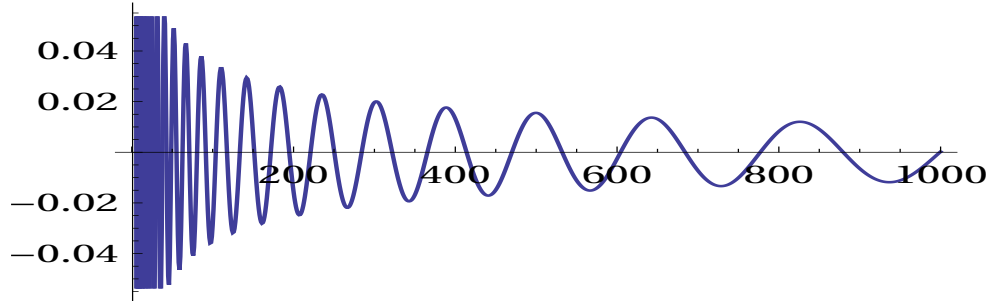


[10000]= 0.0032157230626145682367
 [100000]= 0.0010535193966828991421
 [1000000]= 0.0000943000529583720780
 [10000000]= 0.0000037058782494527016
 [100000000]= 0.0000706293020917810922
 not converge

(The axis is 0.5 -0.0001)

$$\sum_{n=1}^{1000} \left[\frac{\cos[(25.0108) \ln(2n-1)]}{(2n-1)^{0.4999}} - \frac{\cos[(25.0108) \ln(2n)]}{(2n)^{0.4999}} \right] \quad (120)$$

$$= 0.0002340683951231753530213741769410219031263$$

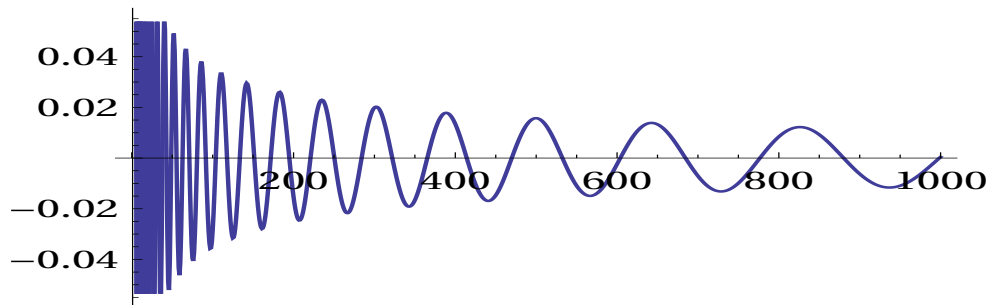


[10000]= 0.0028566554290930883629
 [100000]= 0.0006906044201284139818
 [1000000]= -0.0002709625732176824389
 [10000000]= -0.0003618649905174442603
 [100000000]= -0.0002947302460572199471
 It does not converge to 0.

(The axis is 0.5 as it is.)

$$\sum_{n=1}^{1000} \left[\frac{\cos[(25.0108) \ln(2n-1)]}{(2n-1)^{0.5}} - \frac{\cos[(25.0108) \ln(2n)]}{(2n)^{0.5}} \right] \quad (121)$$

$$= 0.0005985544783954206970746192803864414197669$$

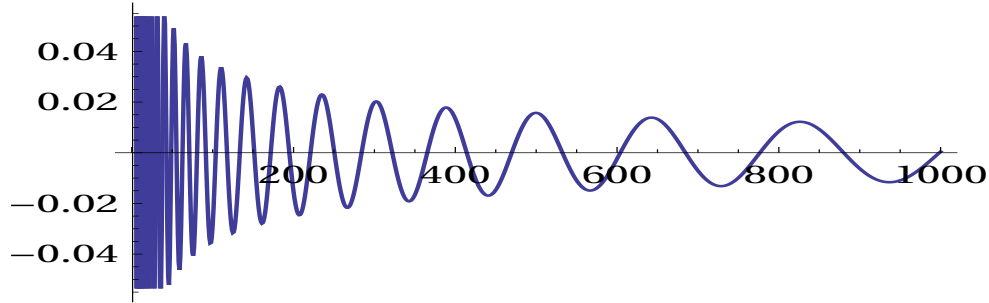


[10000]= 0.0030362058419032560315
 [100000]= 0.0008720793230033872714
 [1000000]= -0.0000883131280091895720
 [10000000]= -0.0001790612933318289318
 [100000000]= -0.0001120322912827072107
 converge

(The axis is 0.5 +0.0001)

$$\sum_{n=1}^{1000} \left[\frac{\cos[(25.0108) \ln(2n-1)]}{(2n-1)^{0.5001}} - \frac{\cos[(25.0108) \ln(2n)]}{(2n)^{0.5001}} \right] \quad (122)$$

$$= 0.0005985544783954206970746192803864414197669$$

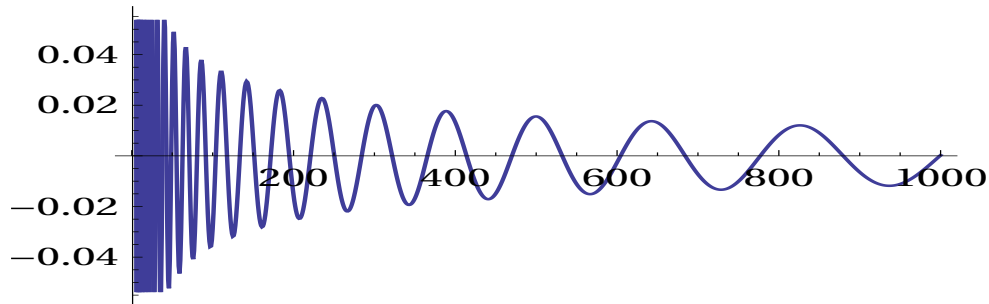


[10000]= 0.0032157230626145682367
 [100000]= 0.0010535193966828991421
 [1000000]= 0.0000943000529583720780
 [10000000]= 0.0000037058782494527016
 [100000000]=0.0000706293020917810922
 It does not converge to 0.

(The axis is 0.5 -0.0001)

$$\sum_{n=1}^{1000} \left[\frac{\cos[(30.4249) \ln(2n-1)]}{(2n-1)^{0.4999}} - \frac{\cos[(30.4249) \ln(2n)]}{(2n)^{0.4999}} \right] \quad (123)$$

$$= -0.003621872781749893703241471240183001932850$$

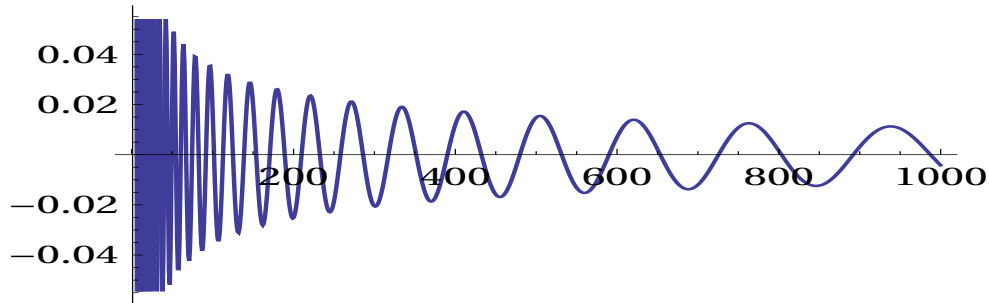


[10000]= -0.0036857273183505895667
 [100000]= -0.0011679318936974449148
 [1000000]= -0.0002732164013939200088
 [10000000]= -0.0001916048617219040962
 [100000000]=-0.0002507092585473904211
 It does not converge to 0.

(The axis is 0.5 +0.0001)

$$\sum_{n=1}^{1000} \left[\frac{\cos[(30.4249) \ln(2n-1)]}{(2n-1)^{0.5001}} - \frac{\cos[(30.4249) \ln(2n)]}{(2n)^{0.5001}} \right] \quad (124)$$

$$= -0.004196378625761797127850868428917737781222$$

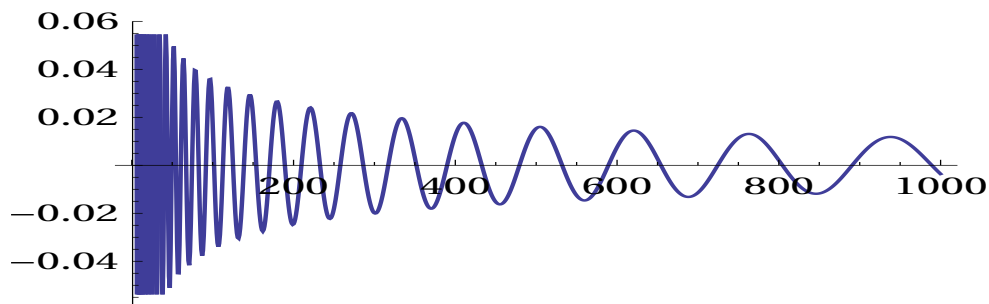


[10000]= -0.0031104335665254672846
 [100000]= -0.0005972140862021245314
 [1000000]= 0.0002953148853648278642
 [10000000]= 0.0003766474981249263716
 [100000000]=0.0003177261764005903698
 It does not converge to 0.

(The axis is 0.5 -0.0001)

$$\sum_{n=1}^{1000} \left[\frac{\cos[(32.9351) \ln(2n-1)]}{(2n-1)^{0.4999}} - \frac{\cos[(32.9351) \ln(2n)]}{(2n)^{0.4999}} \right] \quad (125)$$

$$= -0.006520873872352604350683258279120869089259$$

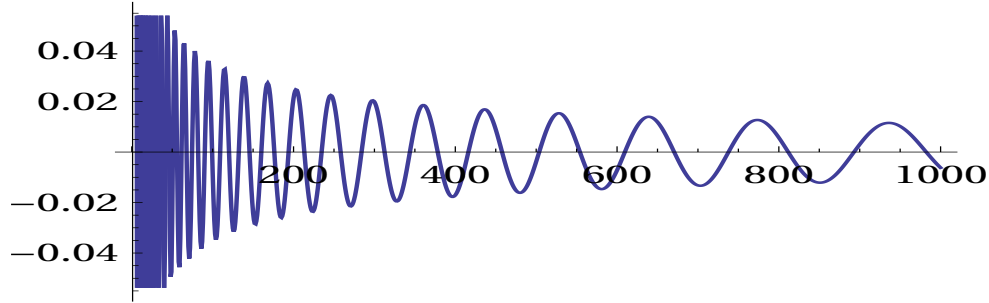


[10000]= -0.0033265870155339848958
 [100000]= -0.0014259997537920011002
 [1000000]= -0.0006499340047967802842
 [10000000]= -0.0003952687549852392001
 [100000000]= -0.0003269916339072487417
 It does not converge to 0.

(The axis is 0.5 as it is.)

$$\sum_{n=1}^{1000} \left[\frac{\cos[(32.9351) \ln(2n-1)]}{(2n-1)^{0.5}} - \frac{\cos[(32.9351) \ln(2n)]}{(2n)^{0.5}} \right] \quad (126)$$

= -0.006211350232338428548135531520246292646547

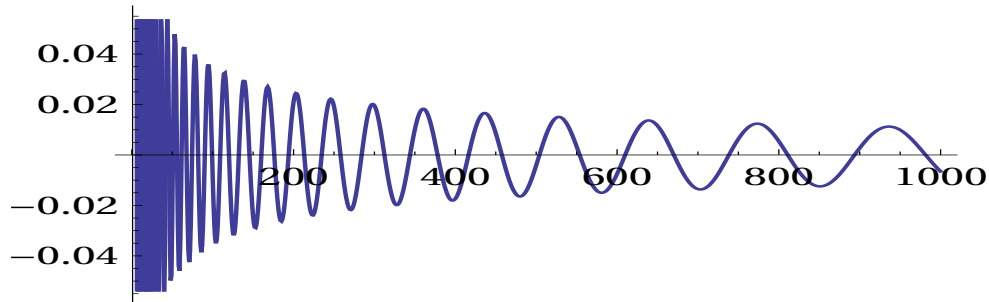


[10000]= -0.0030187974933814079245
 [100000]= -0.0011198358022496601640
 [1000000]= -0.0003446395140902848734
 [10000000]= -0.0000903248133043883523
 [100000000]= -0.0000221594074273025880
 converge to 0.

(The axis is 0.5 +0.0001)

$$\sum_{n=1}^{1000} \left[\frac{\cos[(32.9351) \ln(2n-1)]}{(2n-1)^{0.5001}} - \frac{\cos[(32.9351) \ln(2n)]}{(2n)^{0.5001}} \right] \quad (127)$$

= -0.005901905538729304253398373095610640138367

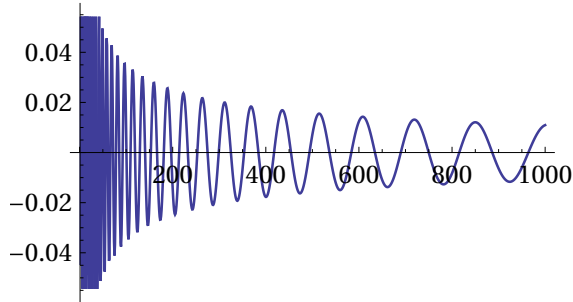


[10000]= -0.0027110862859639232522
 [100000]= -0.0008137488683290382187
 [1000000]= -0.0000394210923560222855
 [10000000]= 0.0002145435362777440636
 [100000000]= 0.0002825974089321377095
 It does not converge to 0.

(The axis is 0.5 -0.0001)

$$\sum_{n=1}^{1000} \left[\frac{\cos[(37.5862) \ln(2n - 1)]}{(2n - 1)^{0.4999}} - \frac{\cos[(37.5862) \ln(2n)]}{(2n)^{0.4999}} \right] \quad (128)$$

= 0.01086045647842345848663450544439839131658....

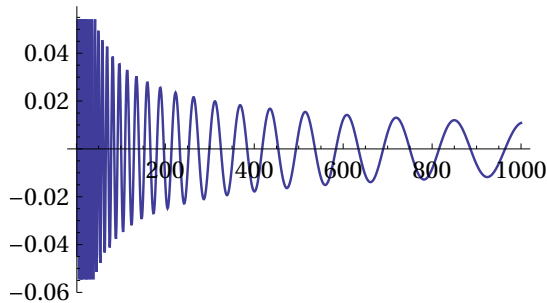


[10000]= -0.0002867678530919621984
 [100000]= -0.0012464273837236416586
 [1000000]= -0.0002241654742639324536
 [10000000]= -0.0000308032050931214237
 [100000000]= -0.0001146022572867225783
 It does not converge to 0.

(The axis is 0.5 as it is.)

$$\sum_{n=1}^{1000} \left[\frac{\cos[(37.5862) \ln(2n - 1)]}{(2n - 1)^{0.5}} - \frac{\cos[(37.5862) \ln(2n)]}{(2n)^{0.5}} \right] \quad (129)$$

= 0.01094179539026480827799190174599114281438....

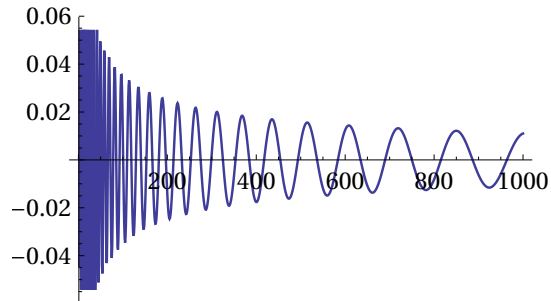


[10000]= -0.0001969237257829878525
 [100000]= -0.0011553773481789157869
 [1000000]= -0.0001343416061451328184
 [10000000]= 0.0000587167172489908842
 [100000000]= -0.0000249459169129748873
 converge to 0.

(The axis is $0.5 + 0.0001$)

$$\sum_{n=1}^{1000} \left[\frac{\cos[(37.5862) \ln(2n - 1)]}{(2n - 1)^{0.5001}} - \frac{\cos[(37.5862) \ln(2n)]}{(2n)^{0.5001}} \right] \quad (130)$$

= 0.01102313386504823888442448029869892963767....



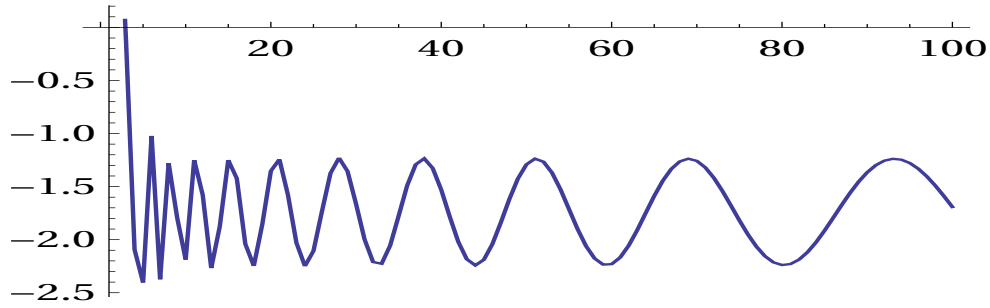
[10000] = -0.0001070865329218817518
[100000] = -0.0010643357530222712949
[1000000] = -0.0000445247128895299153
[10000000] = 0.0001482301450447530726
[100000000] = 0.0000647037088475878962
Hard to judge

Chapter 3

(The axis is 0.00001)

$$\sum_{n=1}^{1000} \left[\frac{\cos[(21.022) \ln(2n-1)]}{(2n-1)^{0.00001}} - \frac{\cos[(21.022) \ln(2n)]}{(2n)^{0.00001}} \right] \quad (131)$$

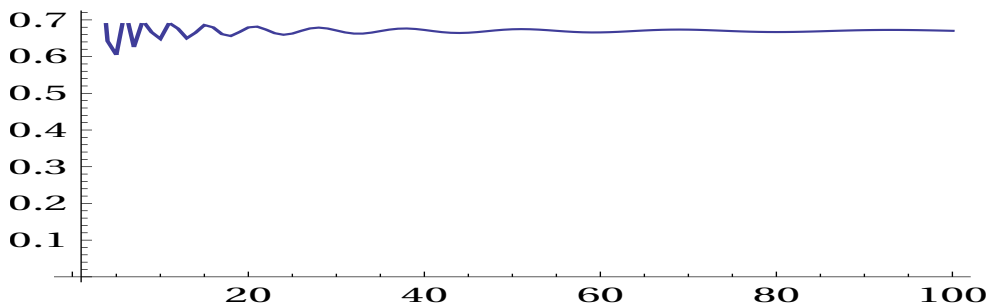
= -1.692375195790290774684627139614558154866....



(The axis is 0.99999)

$$\sum_{n=1}^{1000} \left[\frac{\cos[(21.022) \ln(2n-1)]}{(2n-1)^{0.99999}} - \frac{\cos[(21.022) \ln(2n)]}{(2n)^{0.99999}} \right] \quad (132)$$

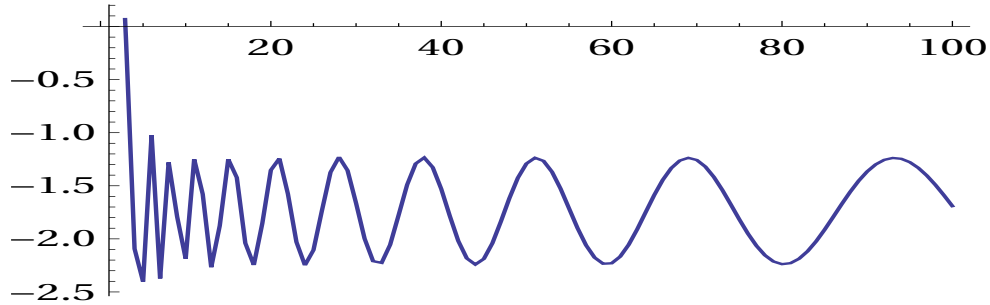
= 0.6702289830344975328514736163562128619393....



(The axis is 0.0001)

$$\sum_{n=1}^{1000} \left[\frac{\cos[(21.022) \ln(2n-1)]}{(2n-1)^{0.0001}} - \frac{\cos[(21.022) \ln(2n)]}{(2n)^{0.0001}} \right] \quad (133)$$

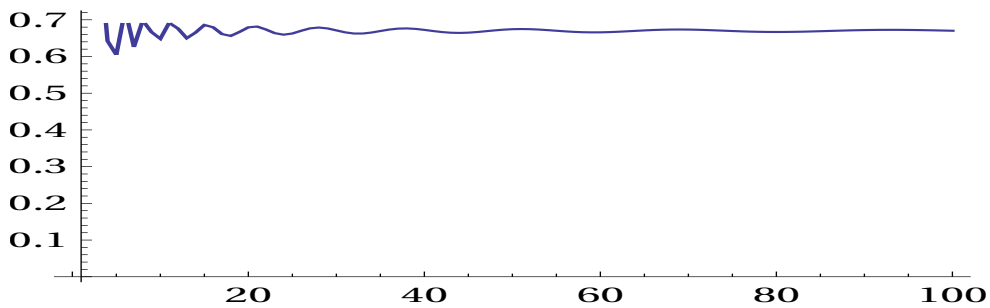
= -1.691914810408940984710921687899051853499....



(The axis is 0.9999)

$$\sum_{n=1}^{1000} \left[\frac{\cos[(21.022) \ln(2n-1)]}{(2n-1)^{0.9999}} - \frac{\cos[(21.022) \ln(2n)]}{(2n)^{0.9999}} \right] \quad (134)$$

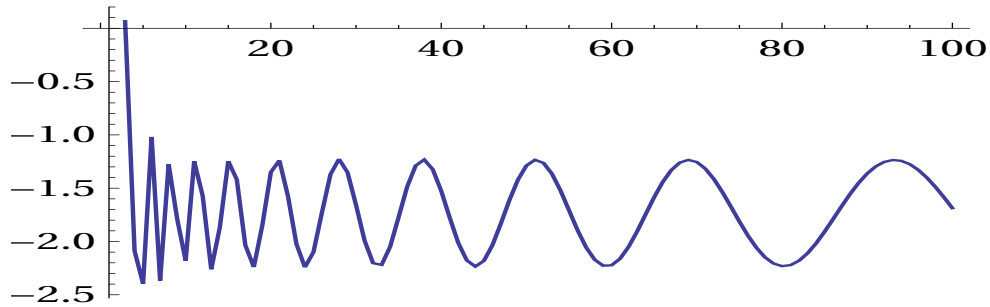
= 0.6701579473614340476047734004873606364368....



(The axis is 0.001)

$$\sum_{n=1}^{1000} \left[\frac{\cos[(21.022) \ln(2n-1)]}{(2n-1)^{0.001}} - \frac{\cos[(21.022) \ln(2n)]}{(2n)^{0.001}} \right] \quad (135)$$

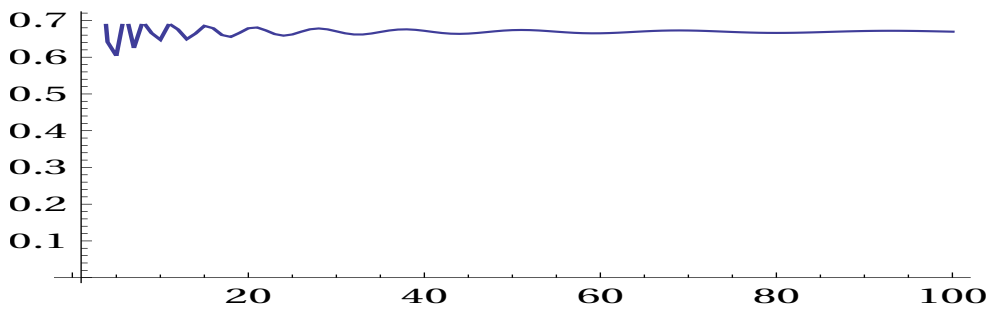
= -1.687314830139069704606318113596237362764....



(The axis is 0.999)

$$\sum_{n=1}^{1000} \left[\frac{\cos[(21.022) \ln(2n-1)]}{(2n-1)^{0.999}} - \frac{\cos[(21.022) \ln(2n)]}{(2n)^{0.999}} \right] \quad (136)$$

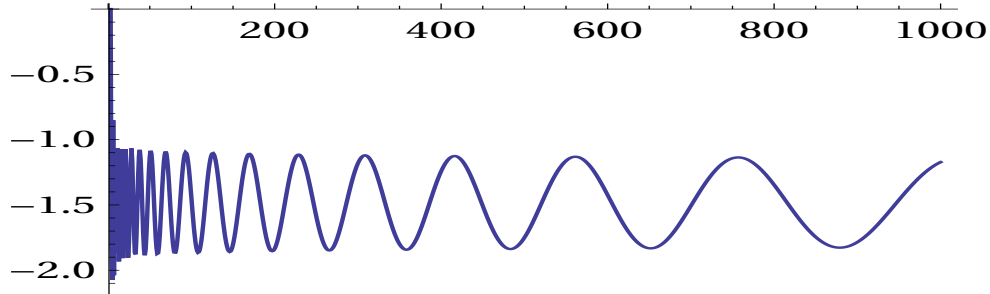
= 0.6694468942442123041861955261085612683792....



(The axis is 0.05)

$$\sum_{n=1}^{1000} \left[\frac{\cos[(21.022) \ln(2n-1)]}{(2n-1)^{0.05}} - \frac{\cos[(21.022) \ln(2n)]}{(2n)^{0.05}} \right] \quad (137)$$

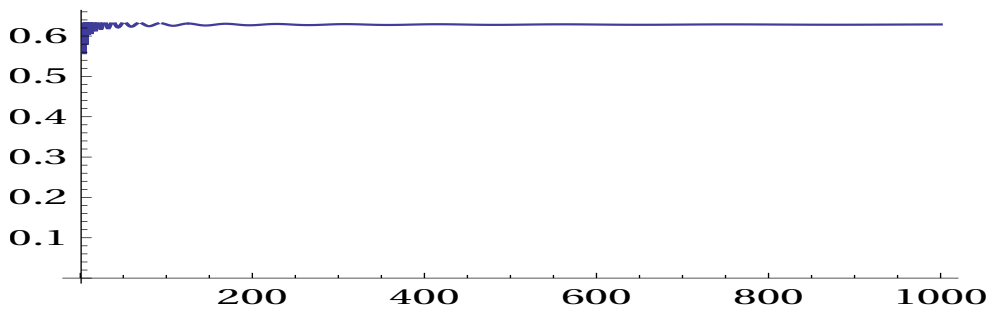
= -1.172026278004103809897515559526482605892....



(The axis is 0.95)

$$\sum_{n=1}^{1000} \left[\frac{\cos[(21.022) \ln(2n-1)]}{(2n-1)^{0.95}} - \frac{\cos[(21.022) \ln(2n)]}{(2n)^{0.95}} \right] \quad (138)$$

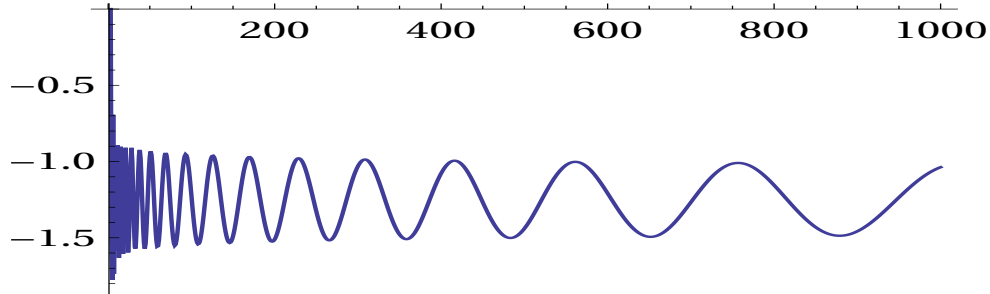
= 0.628793327503768552125482769229183595256....



(The axis is 0.1)

$$\sum_{n=1}^{1000} \left[\frac{\cos[(21.022) \ln(2n-1)]}{(2n-1)^{0.1}} - \frac{\cos[(21.022) \ln(2n)]}{(2n)^{0.1}} \right] \quad (139)$$

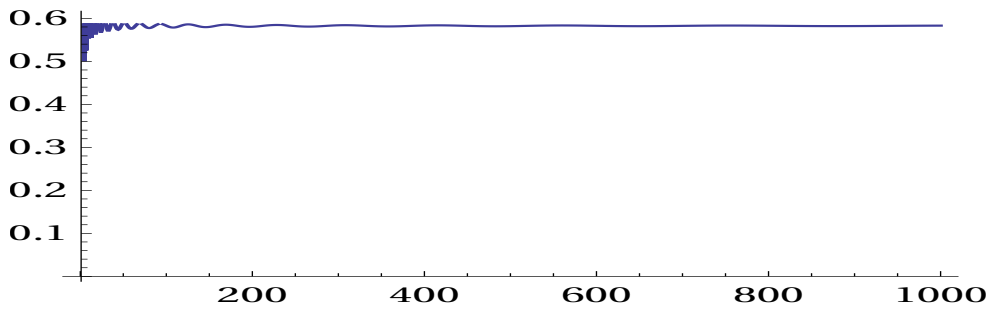
= -1.037181038243812266182221182644218150841....



(The axis is 0.9)

$$\sum_{n=1}^{1000} \left[\frac{\cos[(21.022) \ln(2n-1)]}{(2n-1)^{0.9}} - \frac{\cos[(21.022) \ln(2n)]}{(2n)^{0.9}} \right] \quad (140)$$

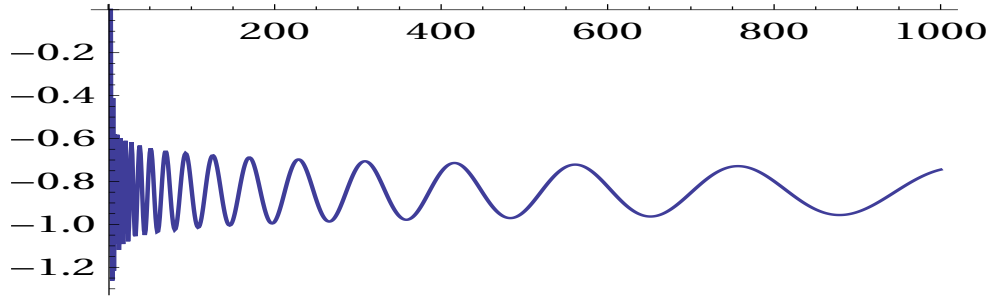
= 0.5830911596701825120483648848326651479726....



(The axis is 0.2)

$$\sum_{n=1}^{1000} \left[\frac{\cos[(21.022) \ln(2n-1)]}{(2n-1)^{0.2}} - \frac{\cos[(21.022) \ln(2n)]}{(2n)^{0.2}} \right] \quad (141)$$

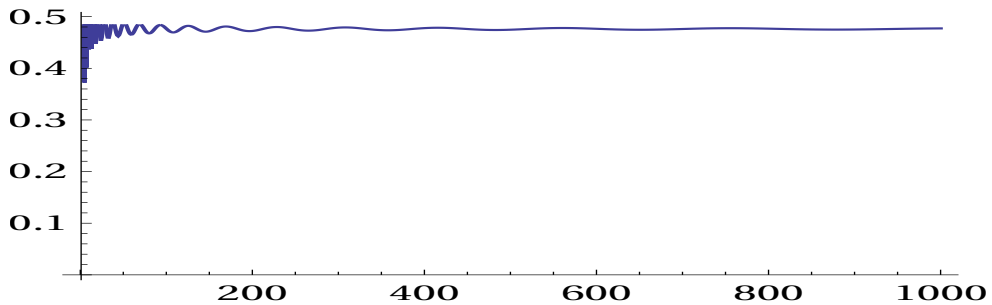
= -0.7447935509966950781141448637295280455100....



(The axis is 0.8)

$$\sum_{n=1}^{1000} \left[\frac{\cos[(21.022) \ln(2n-1)]}{(2n-1)^{0.8}} - \frac{\cos[(21.022) \ln(2n)]}{(2n)^{0.8}} \right] \quad (142)$$

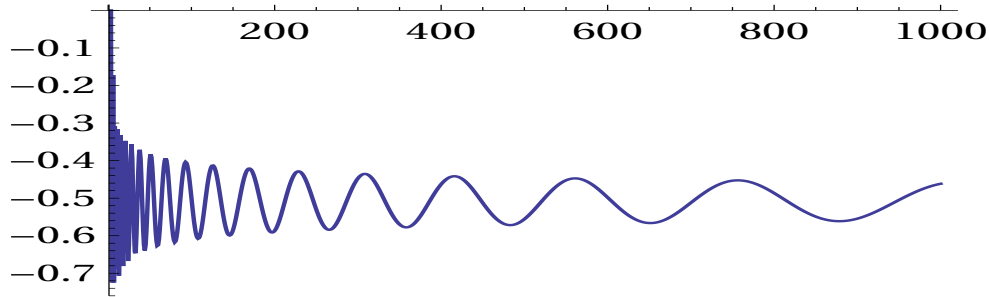
= 0.4772629985235775927819684410214800870668....



(The axis is 0.3)

$$\sum_{n=1}^{1000} \left[\frac{\cos[(21.022) \ln(2n-1)]}{(2n-1)^{0.3}} - \frac{\cos[(21.022) \ln(2n)]}{(2n)^{0.3}} \right] \quad (143)$$

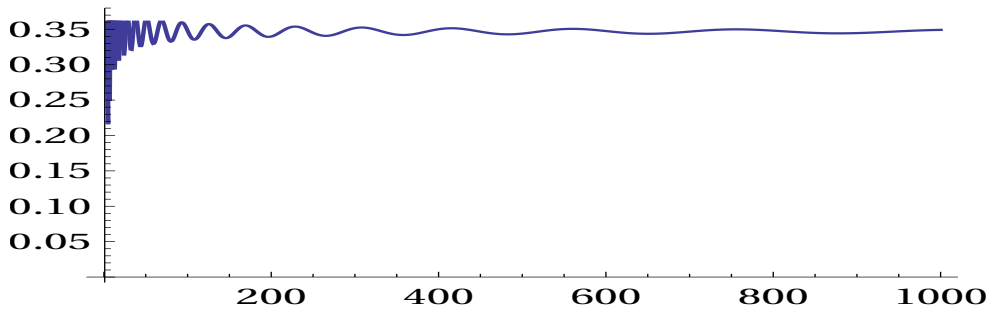
= -0.4616959596387926971677897774383840299575....



(The axis is 0.7)

$$\sum_{n=1}^{1000} \left[\frac{\cos[(21.022) \ln(2n-1)]}{(2n-1)^{0.7}} - \frac{\cos[(21.022) \ln(2n)]}{(2n)^{0.7}} \right] \quad (144)$$

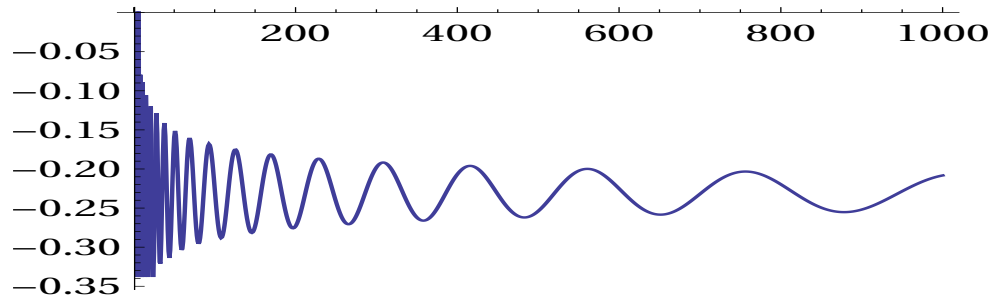
= 0.3491777768362168191173784663503557392773....



(The axis is 0.4)

$$\sum_{n=1}^{1000} \left[\frac{\cos[(21.022) \ln(2n-1)]}{(2n-1)^{0.4}} - \frac{\cos[(21.022) \ln(2n)]}{(2n)^{0.4}} \right] \quad (145)$$

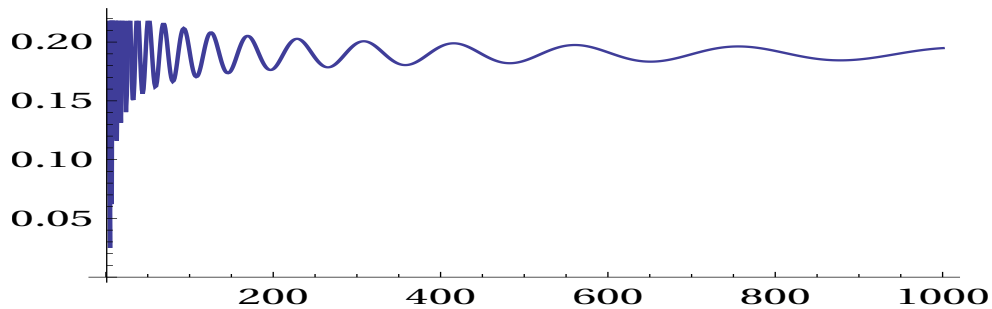
= -0.2082789088719372836582869506635596589817....



(The axis is 0.6)

$$\sum_{n=1}^{1000} \left[\frac{\cos[(21.022) \ln(2n-1)]}{(2n-1)^{0.6}} - \frac{\cos[(21.022) \ln(2n)]}{(2n)^{0.6}} \right] \quad (146)$$

= 0.194859060814332403077140728945857530200....



3 conclusion

I declare that I made the following formula.

When $c=1/2$ and x are non-trivial zero values.

$$\sum_{n=1}^{\infty} \left[\frac{\cos(x \ln(2n-1))}{(2n-1)^c} - \frac{\cos(x \ln(2n))}{(2n)^c} \right] = 0 \quad (147)$$

$$\sum_{n=1}^{\infty} \left[\frac{\sin(x \ln(2n-1))}{(2n-1)^c} - \frac{\sin(x \ln(2n))}{(2n)^c} \right] = 0 \quad (148)$$

References

- [1] B.Riemann.: Uber die Anzahl der Primzahlen unter einer gegebenen Grosse, Mon. Not. Berlin Akad pp.671-680 (1859)
- [2] John Derbyshire.: Prime Obsession: Bernhard Riemann and The Greatest Unsolved Problem in Mathematics, Joseph Henry Press(2003)
- [3] S.Kurokawa.: Riemann hypothesis, Japan Hyoron Press(2009)
- [4] Marcus du Sautoy.: The Music of The Primes, Zahar Press(2007)