Preliminary Values for Wild Constant Hunt, Possibly "Nice" Dirichlet Series Originates

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October 2024, a PayDie tribute

Abstract

This short document purported to publicise assorted constants to be targeted for Reverse Arithmetic (known as unscrambling the egg in pop culture) experimentation. In section one, a tangential intermezzo intended to justify the urgency to archive and some trivia regarding Pie and its defense against the manifesto *of otherwise obscure alternative*. Later sections detail the constants aimed for Reverse Arithmetic experimentation.

1 Pie Defense

When performing spherical integration against spherical coordinate θ and ϕ, it is true that ϕ is needed to be twice of π however, θ is only needed to be π, instead of being its halve.

Also, the series expansion of $sin(k\ sin(x))$ using π as the scaler k producing denominators that follows OEIS A085990. Using twice of π won't produce such result.

Proposition : Since the Pie is now defended, it is welcome to celebrate it, either with eating, or with releasing documentation about novel "number theoretic" constants.

The date is a pun of a famous day on March, it is not a typo, but has the meaning of the urgency to save and document before the progress is lost due to overheated processor **die**, which went toast and now need to **pay** for functional replacement. The author's voluntary experiments were impacted during such incident which consequently prompted for this submission. Further anticipating the macabre of failing computing infrastructures due to age and wear.

2 Constant Menagerie

Suppose that one's being working on Dirichlet series, studying the relation between Totient ϕ against divisor σ, and then encountering infinite sums, that led into various constants.

Assorted constants in this text are obtained using construction of elaborate infinite sums i.e. open form *which may unintentionally representing* multiple zeta function, or at least, conjectured to be some form of Dirichlet series with "nice" coefficients, *viz.* such terms possesing desireable number theoretic properties. Such constants having no name in origin, therefore for convenience may be referred as "the numbers" for PayDie offerings.

The following is one of such constant, has been computed to at least 3110 digits of accuracy:

0.17278705503139434705946417072339198701844887364026081527850486106
9083848069700058930577581141990437783930266755528959848309443941899090
2082510684006569126500609838980311595314958300907342574445569663388337
8125282058847821939112174428731063787050222272143355356162708135079717
0590772632688331820050935368460689737898374234107770394322655338352247
8588566955380936790415766891815567309194760088137184153015810316089687
7667842415019120119263433335810771782415682053036598178242902801129109
7763039850687810320779344331503028865786002346427980890709557283705188
6642752918723597685014266453735171134936707346450485825387948631706160
3879630120805269831350132415478167944459702141050801826615383309102220
6538315697953611725159378078496458453996278136775400319012538894776902
4980893767481143769481075852934785400497270985892753035005544733143781
3678961217142661782637172562322421980697889860034116862738146157078447
7792281942140176386635955910197929688483252342760016101366091191165021
7561549600060463087637133037962816971286651699643483565856330744644811
1416950863606021437115333766202908808659100000976729134793941864917426
3568316532201186151523401463568402958666884977828693575063833285097624
9263870708376681728067799669716511073259689742924764237893710998756532
6748817472886074088170996384658035484966356977603005882975350184283141
4742987845996475922862800693912992532260621301194401619599472193541572
0824591459572612942071241755330083734372232415759109976095046833886854
1458440070595259701909428869600797660276803105587622896487022934933279
1494337171898029510616806016671767314378600548629937992108921180324408
9876478644458367154779689624101989784166145627505626964038746271798435
6979684714738026466012606701472080429376760322181053276894126677008801
8026434924649473293903533495108245226710597188248275883683772300586732
6604992558759045458073512326851709116586198411186896041838470355879007
9159524190506202543080560031090029202525680867460306316507781220008492
2893704922155830300956705687922913301259540432875767973245524701825676
5232894171223908643320350450919616310038278062429069225482395011287019
1616381299111708815259851588887337816856555732997557127330877034714348
5429612525974181210298754602060928452387488989657592790555454197002667
3618695420508597364517100523016181888420960303442262001208912255738017
6141928938053130374015634059543126734600142917265656941741769627673738
3512402875382433878121098304988608578857640963621814871032030669525613
3142528704206901274293959435499847922159844314314594365858929516057226
7887772726413145673483313854543674994549614415299833485181224132054428
2701533555997248533121606244465161910941534046613577981616665395109397

0081681982724621106553213652386568164035714329969393551233014932825408
0615638751956166449462871744705446010504084599305138229155021724464591
5091878628244219455564793033146091600760667396856481105188914822840164
3370049417145196356994807447552336777308941555560216520367327878139848
5013095779970806034998655338179555149249737452153114999770433904832835
6274988765329407335379311192323401518387449392138096057956114238335420
424819904280557474367342004651000099

PSLQ method based on Lattice Reduce approach, along with Plouffe inverter and AskConstants v5.0 (Stoutemyer, 2023) had all been deployed yet managed only to achieve terrible merits. Evenmore *p-adic* values at each aiding points can be more tacit, the following f had been experimentally tested to produce the values below:

$f(2) =$ ...0101010110110000100111001110010110111111110111111001011
0000001100010010110111101110101110110110111100110010101110100110101000100001
$f(3) =$ ...2201222110120000102112201120222110111111122111112201012
0000201200220210122111101110101110122110111100122010101110100110101000100001
$f(5) =$ ...2401242110140000102114201140242110111111142111114201014
0000201400240210142111101110101110142110111100142010101110100110101000100001
$f(7) =$ ...2601262110160000102116201160262110111111162111116201016
0000201600260210162111101110101110162110111100162010101110100110101000100001

and so on towards $\lim_{p\to\infty} f(p)$ in which $\sum_p^\infty f(p)$ asserted to approach the following specific value for each *p-adic* :

- 2-adic ...11000001111010001000010001101111111011101111000111000011110101100010100100110111011011110100101010000000000001100011111110001010100011000111101000010111111010111011010001010100110000000101100101110110110011011000111010011000111000110100000000001011100000111100011010011011000000000010101100101011010011010100011111001011101010001111100010011111111100100101101100111000000111100110111000011010111101101010000000101111101111101100011110011111101010110111010100111011110010110010001001101100001010011100110110010001010010111100001011011010111110100000110100010101011111011111001100000101101011000110110100000000101110110010010000110110101100000011110110100111000011001101110001011100111111000100111100111001011001100100111000110100000001110001110000100011001110111100110111010011100100101100111111100000011011000110011111010100011000000010111101000000100011010101011100001011110000010011010011000001010011111100100110011101000110111100010100110010110101101010100000000110100011111111001101111111101010000001010010010100110111011010000100101000001
- 3-adic ...120101210122012122200020200210100012021122211201112012212111211021101220211111012110121012022222010022212021202211111020102202222201222

101002212101120212110102221002022120102111002022011000102002100001212002101220100212201212200012022211110010200210101121202210221111202012201210020122122020122021000212021202102121100210021122100020111021210111221110200222220101221021201121210120121002010111211021102010200122001220212022200120101101212021012201020200001201011211112122222020110201000001011212022101011022211212121102122021110110212202202201121211022000112020210222001120100002100111222202111020210220222112020220112221020220110110210020020010212022110122212022220111002221001120101102001201022011120212122002201021202001100121202111212110020221010202211122222222102122112120110022012022122011100021222202002211010010121100100222022210010200121000102022210002101002200021220002122010100101221202021121100002112211122202101122111101211110101021220001201102010222020201020111212111020002022102221120010220100210101012210022102221212200

- 5-adic "...1203430214403042404300023133412031031020311241300433434310210423402022201314310310034241342321003412403223302103034234204024430412310213121101023133034331232403430204033002203120334304103320303221133213400032043013200220424010111144124343323014334432224014104432022114412102320203244033400413021021110424011321022044420203432402222142224232000103000402001042310000133110014312100111302331213042023101011344220432202030120404200440320002103330444044223021022014144340320233043413112012040122231044001102233342031232404101422320131232004121012243020244433002314224340113233014310324020300343334232320121422140010444333204012002313131211103231042413244410122214444240202212042022041222101400013313411330212131013220412333020430341124141220222442424013012133421014440103322100022022410302212303011001100233040421021322321122202110431014014441434420420421340403224132314411030222404014011222323032212423410212410011320330240331024340342423343302040221230400213021321430240431231403301034343331103342441142011200343440230341422422023301

- 7-adic ...0150152440436240554125032002625000013065610266503350256116016020634653550034241533264406045611526160152411221353053445344640656354100536455340316160410253461003665206054332153450516436235355354643332363116365220430144345652404021121564561456621020245234112106143012614213336000462400001111460212465460123052211123142125552266225663324641464656140013311255343303340224151430152351553666236201102644541320401431305222225250522316266213501014064656521266056403020264316134441230213642336154546500216025244420624042545633055043266052000324304021133036325634521102040020112566654244431222356333332650023426456354466624613550401012645104541655216400521426361615046312036152113063256133410365112212244261116023553302331455304534263325340353214006266320055424135260311465413651052224151512263650360301632401552026055113014146264065416625363043012340343200533666433225034446561233546555136241522022032205155043552252413636242134646424526020040443206025254154346645232060511326015342223260221654515263452403462233056662331636612533431220110

- 11-adic ...3029789822549755A32A927578786A683233A813A1778112780459756177

947158926037442657143366786943151138 33A962474455569107529A08020785660
764A5A16846137615749889106523520A3088580112015621166669611728147 32A2
75511 A862A8418AA3A3023352670174A05458A8A6781209994680176425016 6872
A138922347509A20345A7064595916664726474AA51681404849040238746A96535
300878605A92323A09A979892609608955 3A620249368938218427 5A368655A4A09
35019775A346151825466574517A22272304735058736653322881983588431509720A
8259525A9966A348887831123195891357478703A443232527769866A4904A75778569
068596367169A61A19A6793887AA29059076A1A41284300840A8033647398718734681
1531564541462A524417566702A64628993A52277741949044134A5A10077A48260080
A65438005A83527A5A7754A669660928752768580275A4168216631A70118925090355
922817659987554890 42AA0A8861190561A6A81A364220726255A88668A46253406838
185973109559051679983730463549 13A808161660244399A2897519459784386 00846
67A524322521644414696A4221813A1975053083A6750A51A92546509502400 29A6413
211397405A91406128600103A2757138A5A9279882829165469A2A611A13837742 4054
74791 91

- 13-adic ...6A8A4752073717C8222C92B83B2A448B6220AC64867054B7114026356727819B387
AC3A7323A29611092C4C4623AA3416C41000514215961697 07A1AC24001B1B8C7AC5B5
9B869B08503854768345C6369033A2B7411B080677B216650C6B1C026867A348BAC098
BAB99204806B4168A1802BA350338A899BA98703C3BC614161A9076C56A7B2130CA009
75CBB74B8237409BA653626C3A977B005B82892996238C525127134AB831745A907573
459255622871B2941972611003B552310788766984C41996B9A0A97415243A6229697B
A5CB873546B93421871B56089A3A478BB2883AB36862493192342139 29C641957815BA
36B334AAAA153339BC7110907C5C958362859945CB977906365870079672C8C8B549A4
08534462CC2347CA84A128874CA8325BB07CA876A736781B515B20763637660C367400
69722C7604A09407058995057C648249797B326C1C26229B42939466341348800AAB1B
50B748145681BC9532A207A40A724051B4348A882A2672175783BC8172825C1BC3A634
054910A94A455B90656121CC7C01BC7C7529382A3103C33A56550A724032086445B91A
858703A6B77C91870A95B55481184971282044554 8B0115AA93761794131BB55979580
B3439163788B13A26603B690A00109422BB7951C8A29788875A5023CB70B741A4AC285
59287C893718177813B3154A49C865B629610C3499A08741B808A1

Such assertion yielded from approximation series S against the unknown f, which its analytic series against *p-adic* systems had been parametrised into converging values within at least 1031 exact figures. Hitherto closed form expression of S is subject for hunting. As of 2024 October 31st, established arsenal for wild constant hunting still inadequate to establish linear relationship between any aftermentioned values.

Citations

Simon Plouffe, Approximations de séries génératrices et quelques conjectures, Dissertation, Université du Québec à Montréal, 1992; arXiv:0911.4975 [math.NT], 2009.

David R. Stoutemyer. 2023. How to hunt wild constants. Maple Trans. 3, 1, Article 14661 (February 2023), 32 pages. Accessible from https://doi.org/10.5206/mt.v3i1.14661

David H. Bailey, "A Compendium of BBP-Type Formulas," available at http://crd.lbl.gov/∼dhbailey/dhbpapers/bbp-formulas.pdf

David H. Bailey, Jonathan M. Borwein and Roland Girgensohn, "Experimental Evaluation of Euler Sums," Experimental Mathematics, vol. 4, no. 1, 1994, pg. 17–30.