Table of current records for the computation of constants

last update was June 8, 2000 by Simon Plouffe

N'th binary digit computations
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Notes

Classical constants
Pi = 3.141592653589...

Precision : 206,158,430,000 decimal digits (almost $3*2^{36}$).
Time of computation : about 37 and 46 hours for each computation.
Machine: HITACHI SR8000.
Who : Yasumasa Kanada and Daisuke Takahashi (University of Tokyo).
When : From June 26 to September 20 1999 (2 independant runs).
Algorithms : Gauss-Legendre and Borwein's 4'th order iteration.

1/Pi = 0.3183098661...

Precision : 206,158,430,000 digits which is almost $3*2^{36}$.
Time of computation: Same as above

When : From June 26 to September 20 1999 (2 independant runs).
Algorithm : Gauss-Legendre and Borwein's 4'th order iteration.

$$E = 2.71828182845...$$

Precision : 1,250,000,000 digits. (for downloads see The Big files directory)
Time of computation: real time: 79 hours and 30 minutes.
Who : Xavier Gourdon
When : 1999, Nov, 14 (verification : 1999, Nov 21)
Timing : The computation took 39h and 52 minutes on a IBM ThinkPad
(PII 350 Mhz, 320 Mo of memory). The verification took 40 hours 25
minutes on the same machine.

$$Catalan = 0.915965594...$$

Precision : 12,500,000 digits. (for downloads see The Big files directory)
Machine: sgi r10000, 256 Mo of memory.
Time of computation: 18 hours, 1 min.
Who : Xavier Gourdon (Xavier.Gourdon@inria.fr)
When : December 30-31, 1997.

$$Zeta(3) = 1.2020569031...$$

Precision : 128,000,026 digits. (for downloads see The Big files directory)
Time of computation: under 40 hours
Machines :IBM S/390 G5 CMOS (9672-RX6) and IBM Power2 SC 135
MHz, 2 GB RAM, GNU C++ 2.8.0, AIX 4.1.5. and IBM PowerPC 604e 233
MHz, 1 GB RAM, GNU C++ 2.8.0, AIX 4.1.5.
Who : Sebastian Wedeniwski (wedeniws@de.ibm.com)
When : December 13, 1998
Note : Agrees with double computation to 128 million digits.

$$Euler's\ gamma = 0.577215664901...$$

Precision : 108,000,000 digits.
Time of computation: 47 hours and 36 minutes.
Machine: HP J5000, 2 processors PA 8500 (440 Mhz), 2 Gigabytes of memory.
Who : Patrick Demichel and Xavier Gourdon see also his constants page.
When : between September 23 and 26, 1999.

$$\log(2) = 0.69314718055...$$

Precision : 108,000,000 digits. (for downloads see The Big files directory)
Time of computation: 47 hours.
Machine: sgi r10000, 256 Mo of memory.
Who : Xavier Gourdon : see also his constants page.
When : from January 23 to 25, 1998

Golden Ratio = 1.6180339887... and the square root of 5

Precision : Over 1.5 billion digits. (for downloads see The Big files directory for 10 million digits).
Time of computation: Less than 3 hours in all.
Machine: Pentium III, 700 Mhz, 512 Megabytes RAM + 10 gigs disk.
Who : Xavier Gourdon and Pascal Sebah see also constants page for other details.
When : May 2000.

Square root of 2 = 1.414213562373095...

Precision : 137,438,953,444 digits ($2^{37}-28$).
Time of computation: 7.5 hours and 205 Gb of main memory.
Machine : Hitachi SR2201 with 1024 processors.
Who : Yasumasa Kanada and Daisuke Takahashi .
When : August 03, 1997.

N'th binary digit computations of Pi

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Bailey, Borwein, Plouffe       Nov. 1995      40, 000, 000, 000 (hexa 921C73C6838FB2)
Bellard                        Jul. 1996     200, 000, 000, 000 (hexa 1A10A49B3E2B82A4404F9193
Bellard                        Oct. 1996     400, 000, 000, 000 (hexa 9C381872D27596F81D0E48B9
Percival                       Jan, 1998     800, 000, 000, 000 (hexa 3E6
FBDAC38A97197785ED).
Bellard                        Sep. 1997   1, 000, 000, 000, 000 (hexa 87F72B1DC9786914B15B16FE
Pihex project          August 21, 1998 5, 000, 000, 000, 000 (hexa 07E45733CC790B5B5979).
Pihex project          February 9, 1999 40, 000, 000, 000, 000 (hexa A0F9FF371D17593E0).
Pihex project            To come        1000, 000, 000, 000, 000 almost done!
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Other interesting computations

Continued Fraction expansion of Pi : 20,000,000 terms by Hans Havermann (June 1999).
see also these interesting pages and graphics.
Bernoulli Numbers: B10000, , B30000, B72000, B100000, B200000 by Greg J. Fee and Simon Plouffe
Zeros of Riemann's Zeta Function, first 100 zeros to 1000 Digits by Andrew M. Odlyzko.
Madelung Constant, by David H. Bailey (1995).
Khintchine Constant, 110,000 Digits by Xavier Gourdon
Continued fraction of Khintchine constant by Hans Havermann.
Zeta(3) and Zeta(5) : by David Broadhurst : 40,000,000'th binary digit (1998).
Zeta(5) : David Broadhurst and Patrick Demichel : 1000000 digits (July 1998).
Zeta(7) : 50000 digits by Simon Plouffe (July 23 1998).
Zeta values (from 3 to 99) by Robert J. Harley to 10000 digits each (July 1998).
Feigenbaum's Constant : 578 digits (Keith Briggs and David H. Bailey).

Additional notes.

Pi in hexadecimal (or binary).

The 5 trillion'th binary digit of Pi was computed twice and the project was conducted by Colin Percival with the help of more than 25 other people and their computers (mostly all Pentiums). The computation took more than 13500 hours of combined CPU. Details of the project are at Simon Fraser University. Percival also initiated the computation of the position $40*10^{12}$ and also 10^{15}.

Exp(1) : The computation of exp(1) was carried to 1.7 billion digits by Patrick Demichel before Nov. 21 1999 and was used to verify Xavier Gourdon computation

Computation of **sqrt(2)/2** was carried at the same time as the one for sqrt(2) and took only 32.5 minutes to check.

If you think you can do better than any of those records : Yes, go ahead, this is exactly why this page is here. Send files/comments/suggestions to plouffe@math.uqam.ca

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