WRITEUP.pdf

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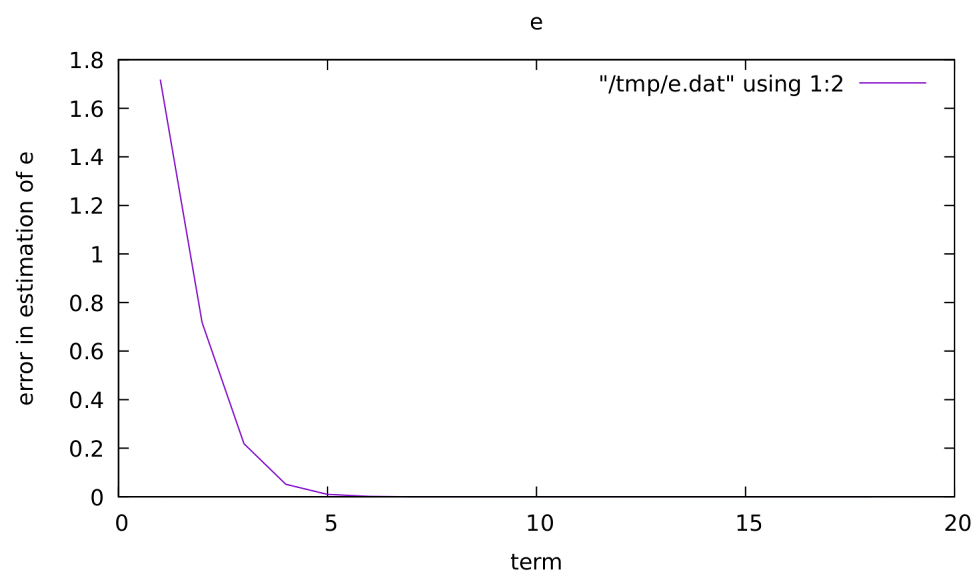
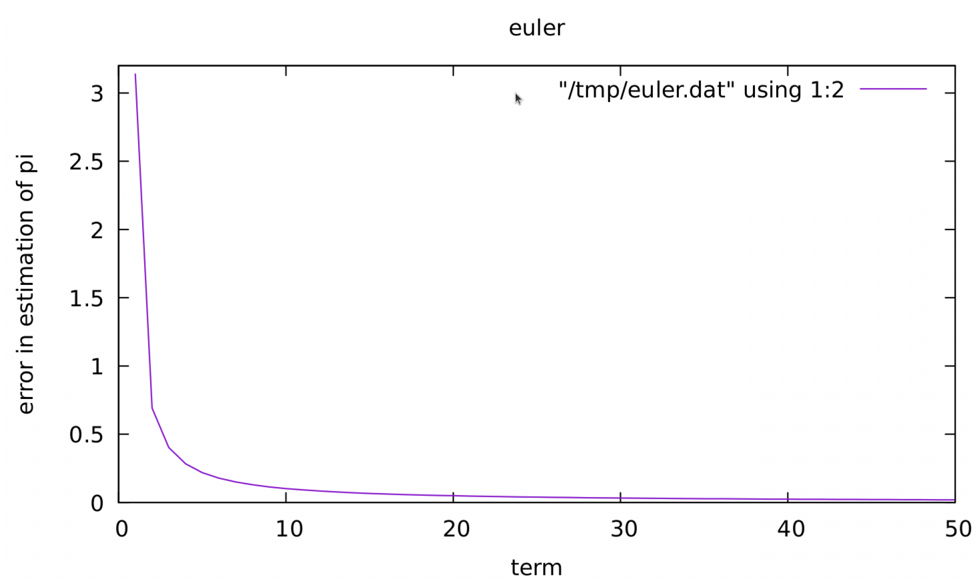
e.c



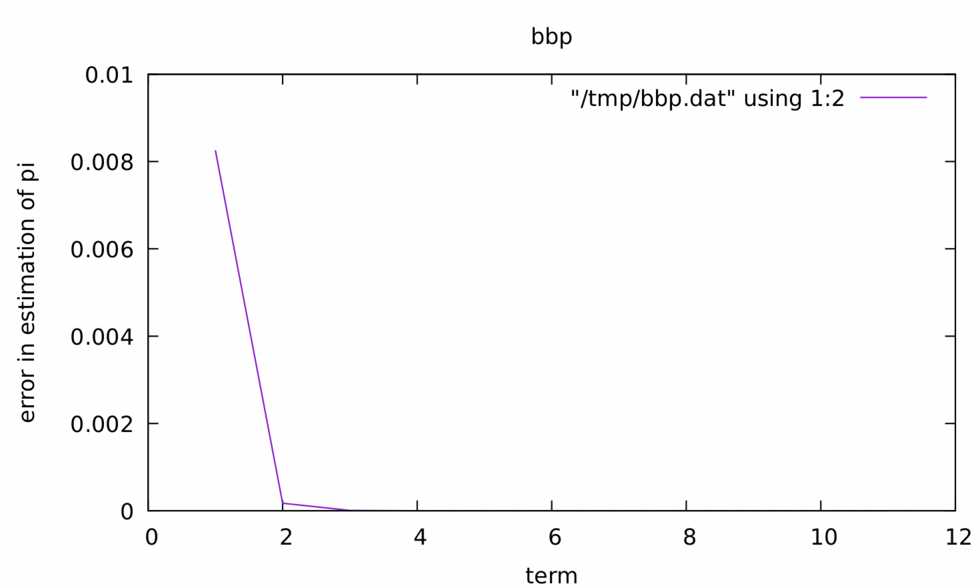
output of e.c: 2.718281828459046
terms used: 18
true e from math library:2.718281828459045
difference: 0.000000000000000
There is no difference between the estimation of e and the true value of e for up to 16 numbers. This is an accurate estimation for not many values since the term in the Taylor Series (1/k!) grows very fast. This number gets smaller as k grows, so adding more terms makes a minute difference once k is sufficently large.

euler.c



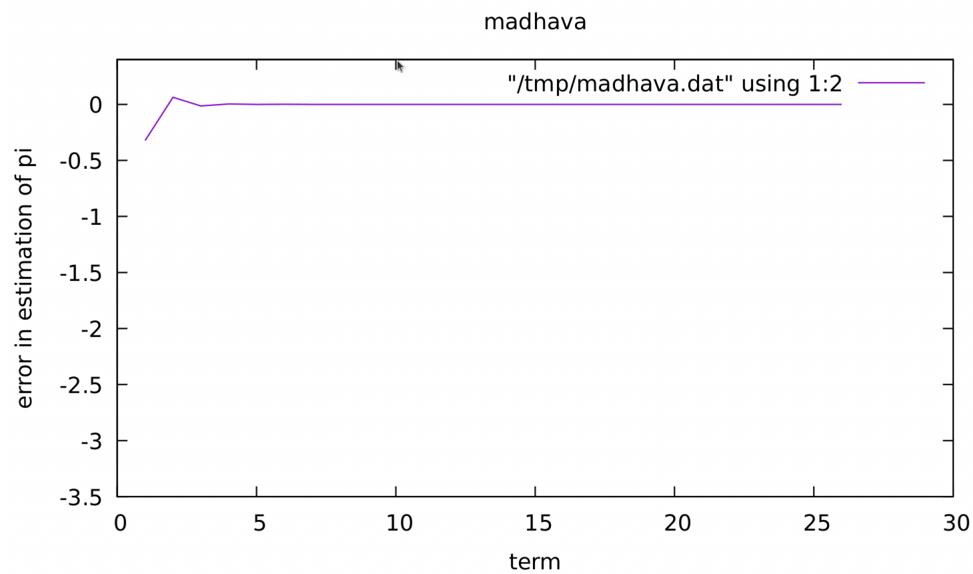
output of euler.c:3.141592558095903
terms used: 10000000 true PI from math library:3.141592653589793
difference: 0.000000095493891
There is a moderate difference between the estimation of pi and the true value of pi. This is likely because Euler's method is not very efficient. This is further evident by the fact that 10,000,000 terms had to be used to even get this estimation. The other estimations are much more accurate and can be calculated with significantly less terms.

bbp.c



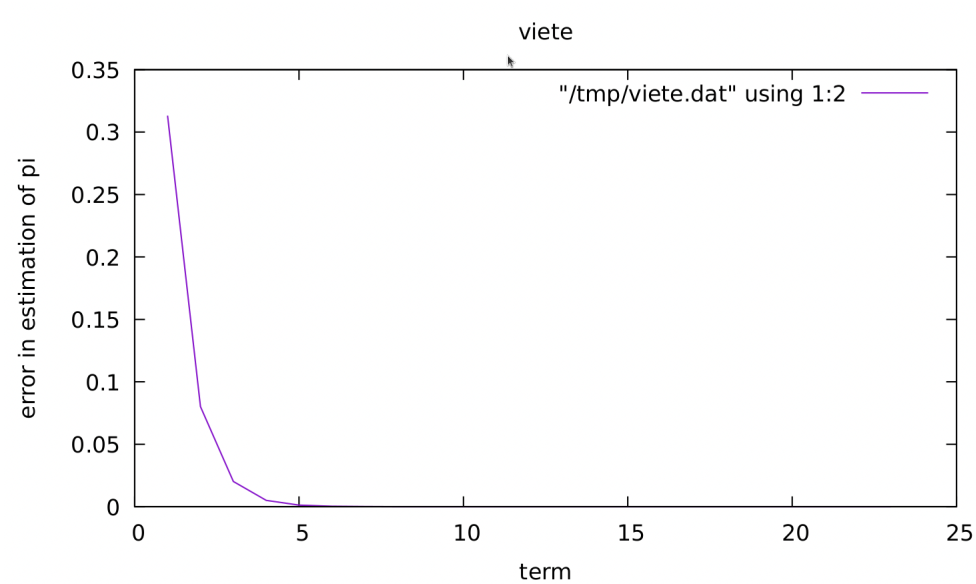
output of bbp.c:3.141592653589793
terms used: 11
true PI from math library: 3.141592653589793
difference: 0.000000000000000
There is no difference between the estimation of pi and the true value of pi for up to 16 numbers. This is because the Bailey-Borwein-Plouffe formula is accurate to the real value of pi. Furthermore, relatively few terms were used. Since the term being calculated for each k in the series has (16)ˆ(-k), the terms approach zero as k grows larger. Thus, after k is sufficiently large, adding more terms makes a minute difference.

madhava.c



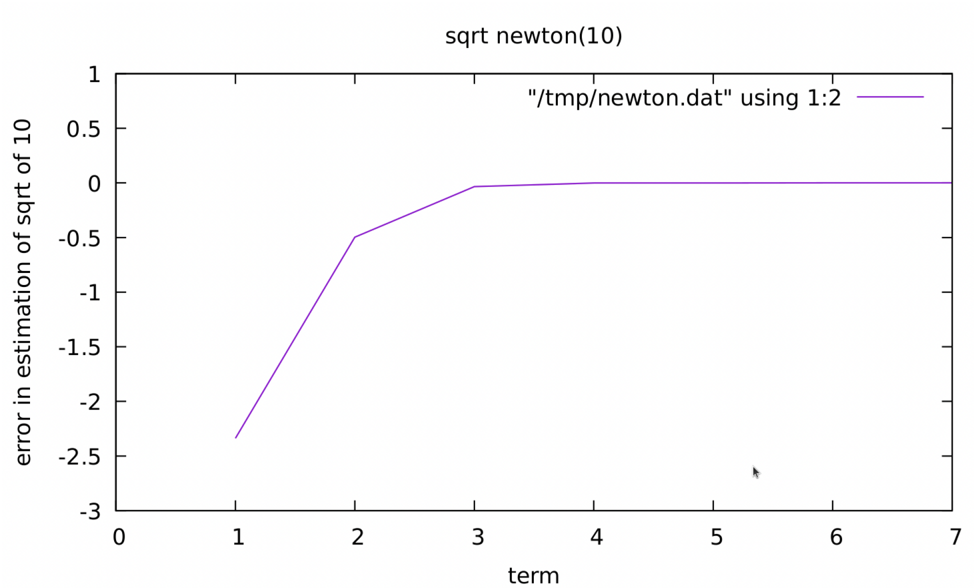
output of madhava.c:3.141592653589800
terms used: 27
true PI from math library:3.141592653589793
difference: 0.000000000000007
There is a very small difference between the estimation of pi and the true value of pi. This is because the Madhava series is very accurate. Furthermore, relatively few terms were used. Since the term being calculated for each k in the series has (-3)$\hat{}$(-k), the terms approach zero as k grows larger. Thus, after k is sufficiently large, adding more terms makes a minute difference. //

viete.c



output of viete.c: 3.141592653589775
terms used: 47
true PI from math library: 3.141592653589793
difference: 0.000000000000018
There is a very small difference between the estimation of pi and the true value of pi. This is because Viete's formula is very accurate. Furthermore, this estimation was computed in relatively few terms since the terms grow very close to 1 as k increases. Since the terms are being multiplied, this means that after a k is sufficiently large, using more terms makes a minute difference.

newton.c



The graph of sqrt_newton(10) is graphed.
output of newton.c:
sqrt of 1: 1.000000000000000, terms used: 1
true value:1.000000000000000, difference:0.000000000000000

sqrt of 5: 2.236067977499789, terms used: 7
true value: 2.236067977499789, difference:0.000000000000000

sqrt of 10: 3.162277660168376, terms used: 7
true value: 3.162277660168376, difference:0.000000000000000

There is no difference to 16 digits between the estimated sqaure roots and the true square roots for values between 0 and 10. This is because the estimations are very accurate.