72-APROX-chudnovski-bbp

February 5, 2018

0.1 Chudnovski

```
In [ ]: def F(n):
            return ((-1)^n*(factorial(6*n))*(545140134*n+13591409))/(factorial(3*n)*(factorial

In [ ]: def pi_chudnovski(digits=100):
            k = 0
            S = 0
            while 1:
                S += F(k)
                if floor(abs(10^digits*F(k))) == 0:
                    break
                k += 1
            return (426880*sqrt(10005).n(digits=digits))/S,k
```

0.2 Algoritmo BBP

```
In [ ]: def F0(j,n):
            S =RR(0.0)
            k =0
            while k <= n:
                r = 8*k+j
                S += RR(power_mod(16,n-k,r)/r)-floor(RR(power_mod(16,n-k,r)/r))
                k += 1
            return RR(S)

        def F1(j,n):
            S =RR(0.0)
            k =n+1
            while 1:
                r = 8*k+j
                nS = S+ RR(16^(n-k)/r)
                if S == nS:
                    break
                else:
                    S = nS
                k += 1
            return RR(S)
```

```
def S(j,n):
    return RR(F0(j,n)+F1(j,n))

def cifra_pi(n):
    n -= 1
    x = (4*RR(S(1,n))-2*RR(S(4,n))-RR(S(5,n))-RR(S(6,n)))
    return (x-floor(x)).str(base=16)
```

La cadena C contiene, para poder comprobar los resultados obtenidos con el algoritmo, cifras hexadecimales de π empezando después del punto.

```
In [ ]: C = '243F6A8885A308D313198A2E03707344A4093822299F31D0082EFA98EC4E6C89452821E\
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