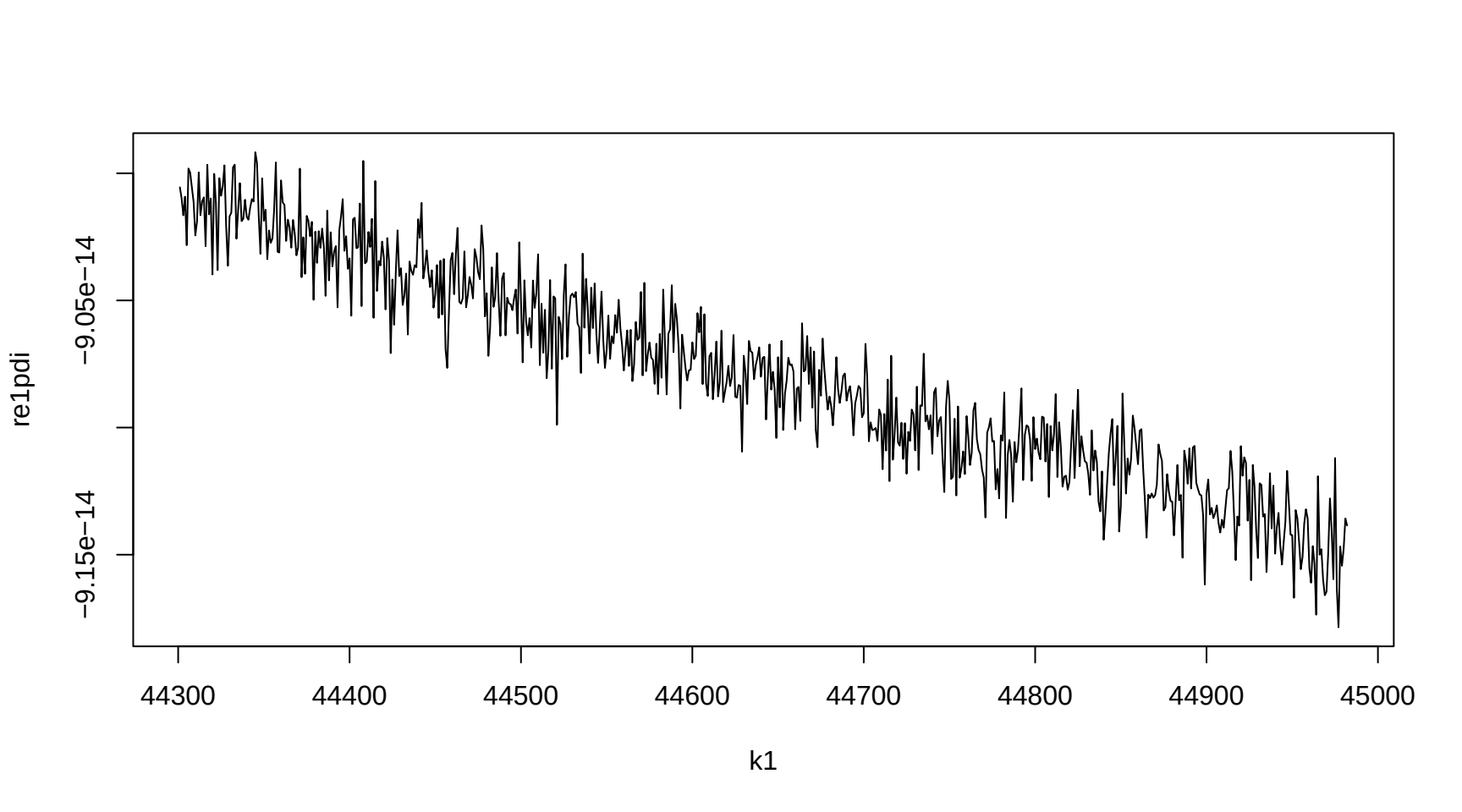
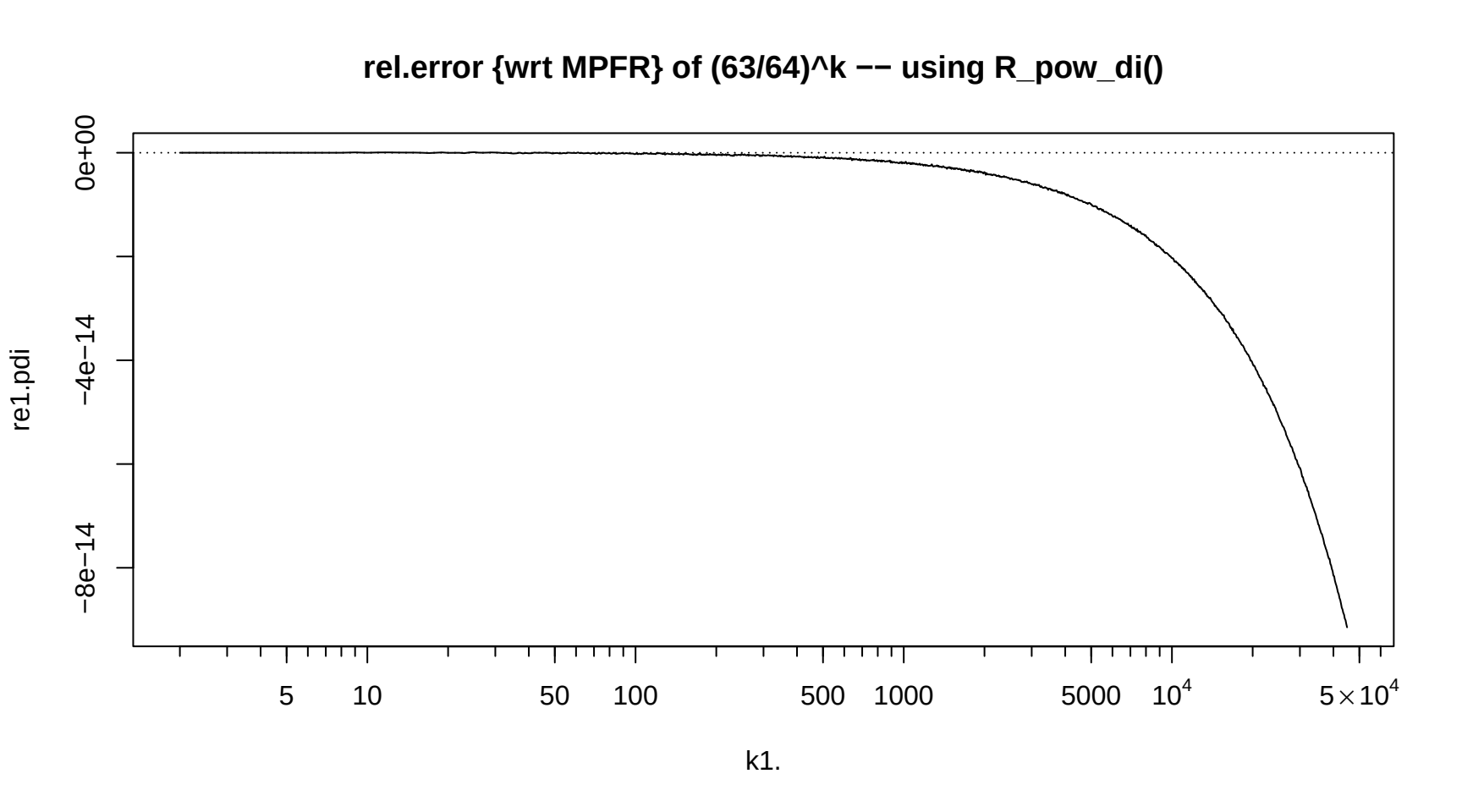
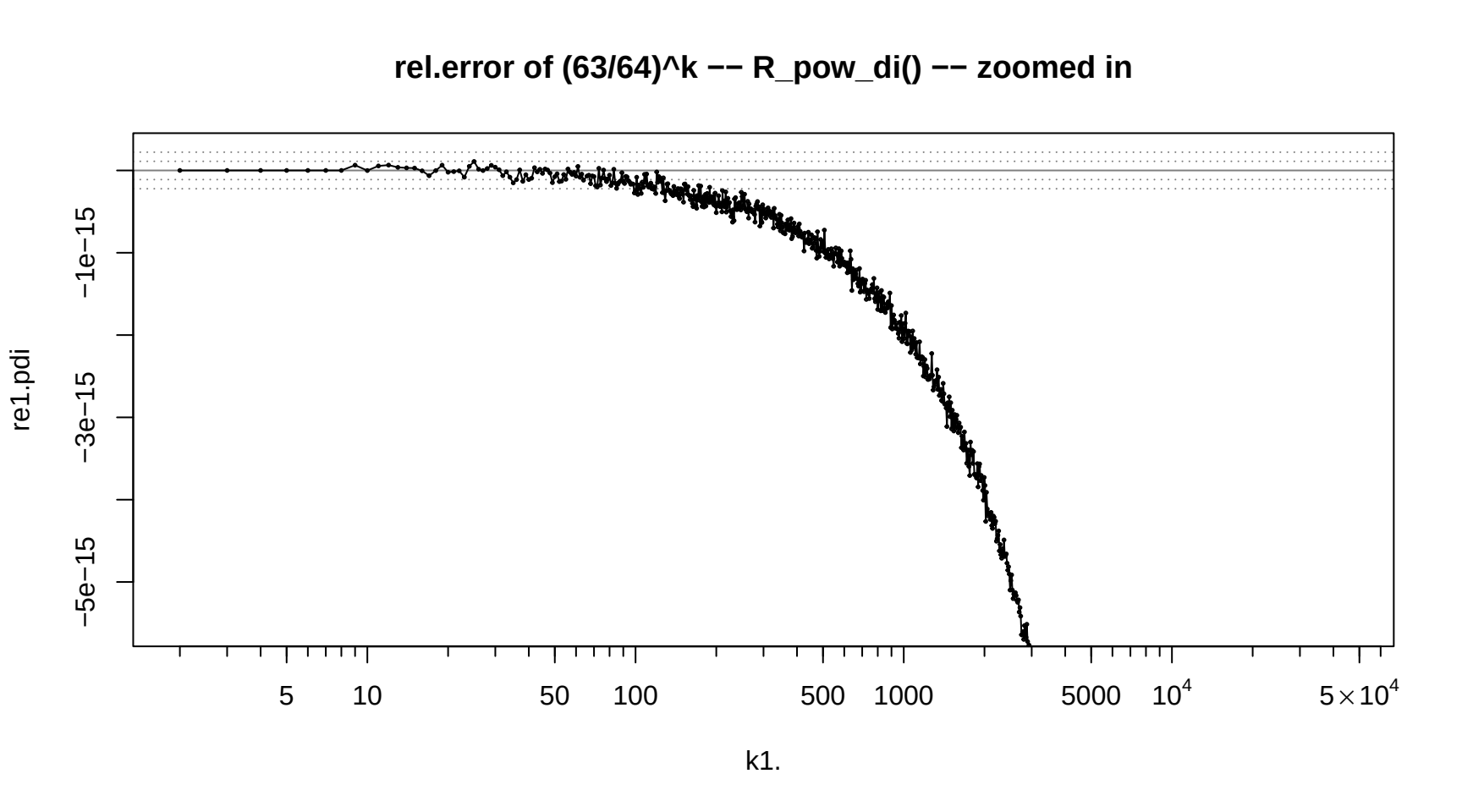
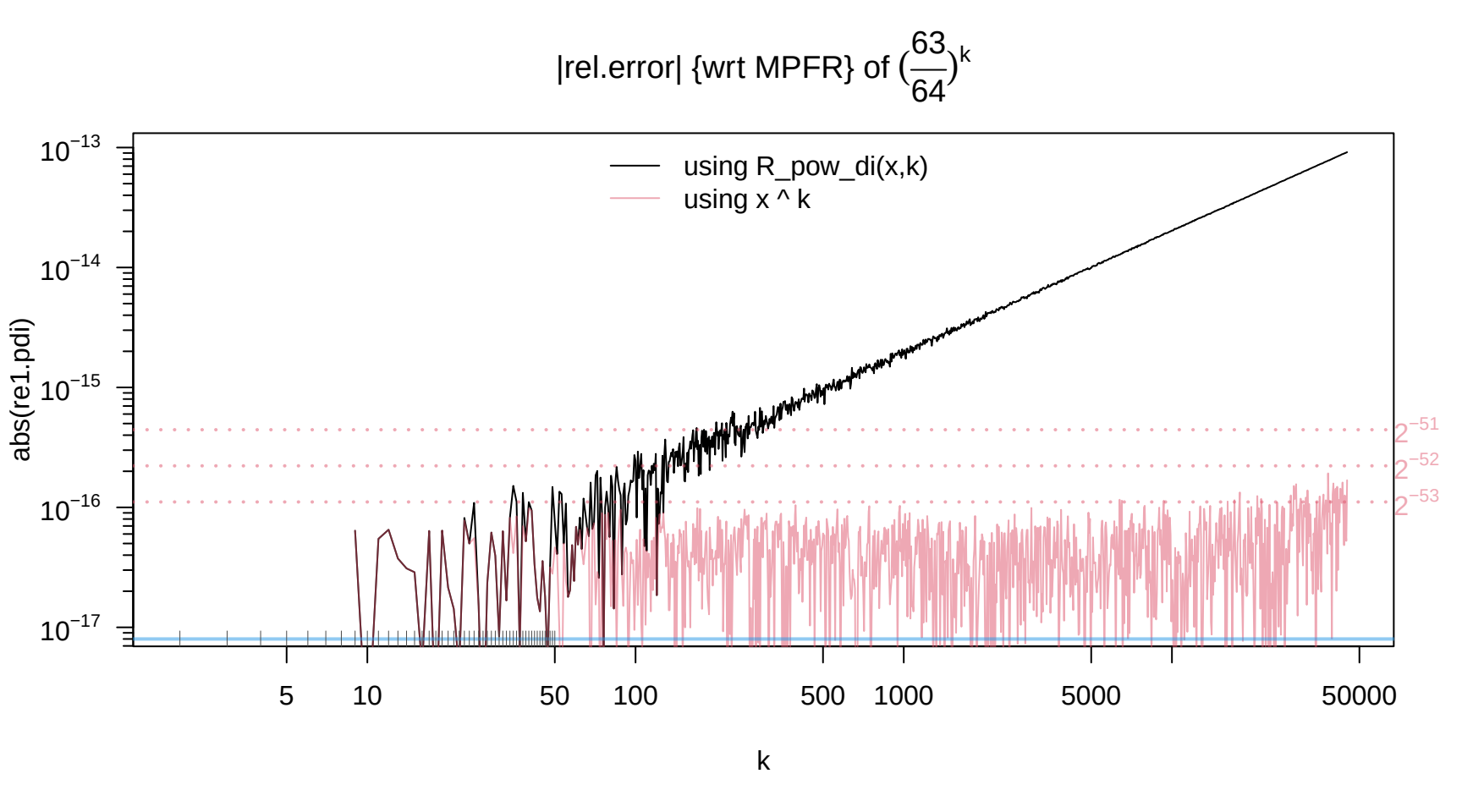
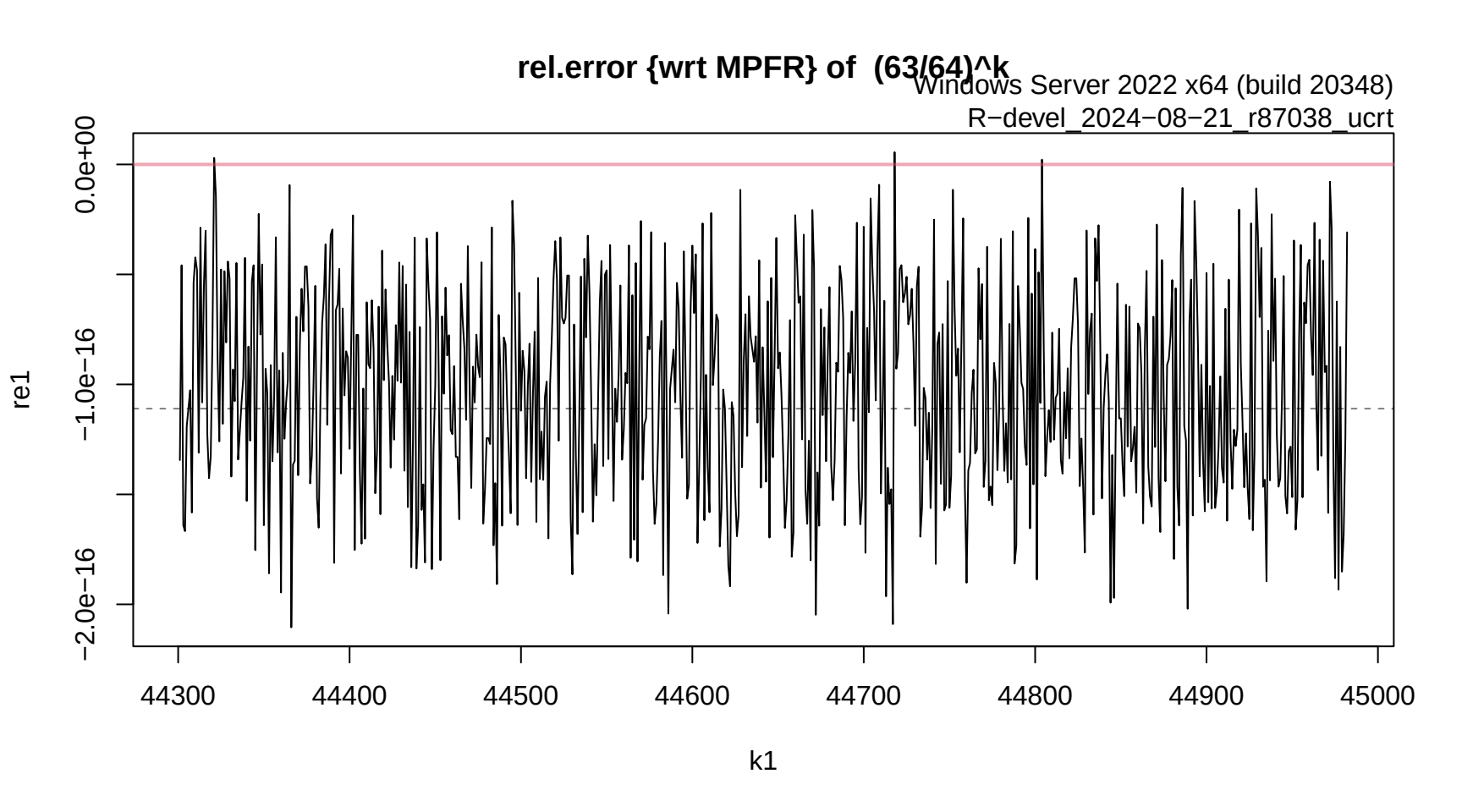
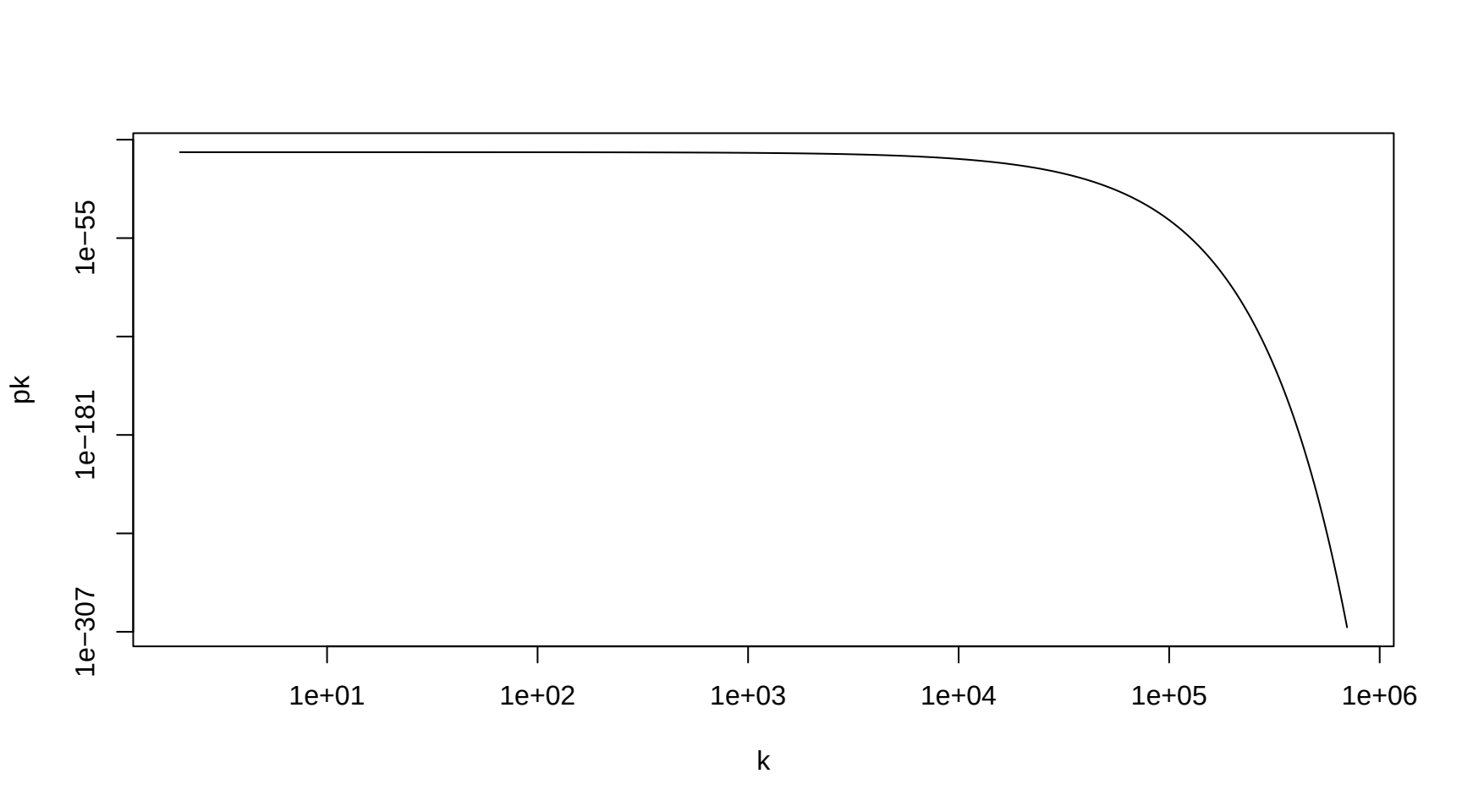

re1pdi
−9.05e−14
−9.15e−14
44300
44400
44500
44600
44700
44800
44900
45000
k1

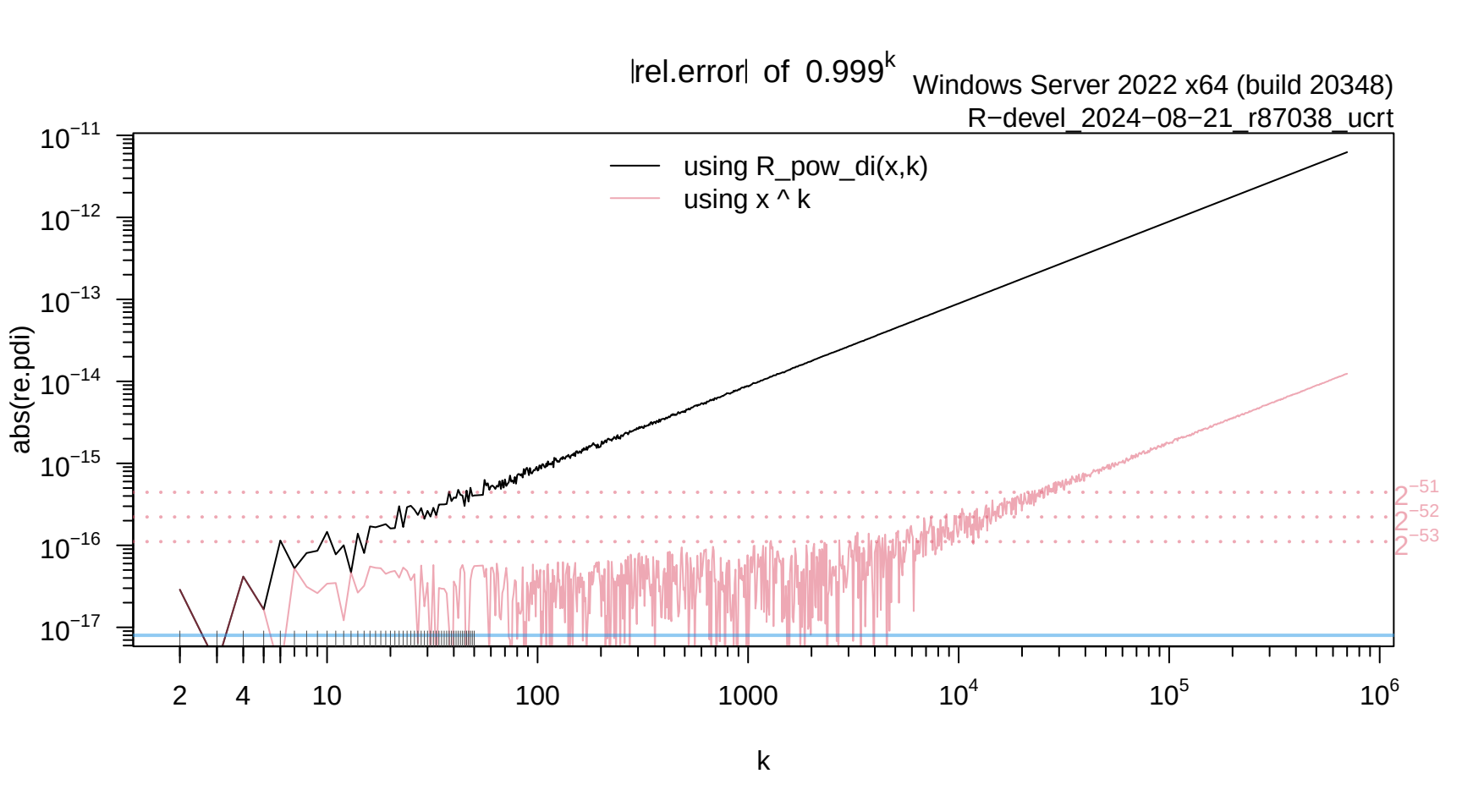

rel.error {wrt MPFR} of (63/64)^k −− using R_pow_di()
re1.pdi
0e+00
−4e−14
−8e−14
5
10
50
100
500
1000
5000
10^4
5×10^4
k1.

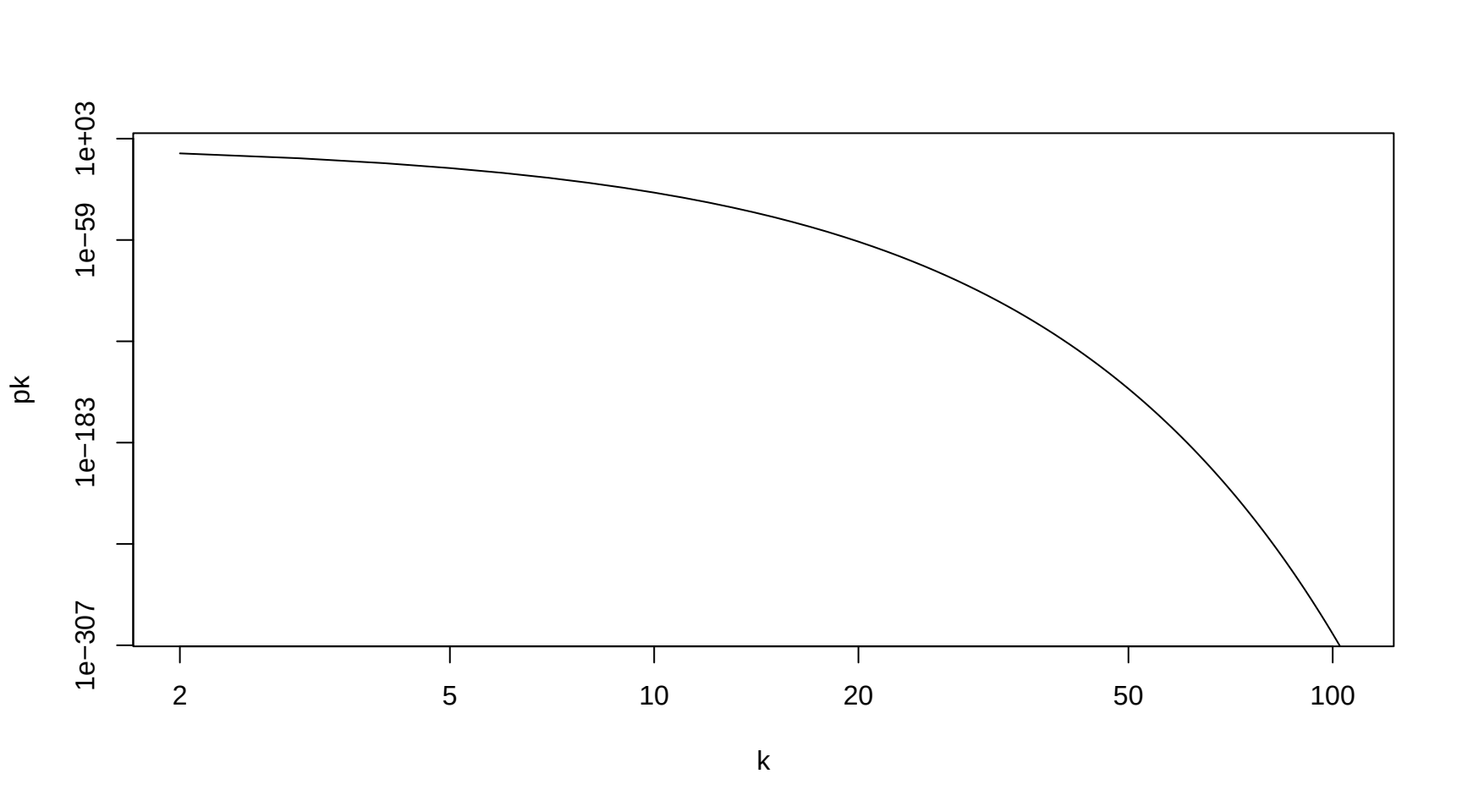

rel.error of (63/64)^k −− R_pow_di() −− zoomed in
re1.pdi
−1e−15
−3e−15
−5e−15
5
10
50
100
500
1000
5000
10^4
5×10^4
k1.

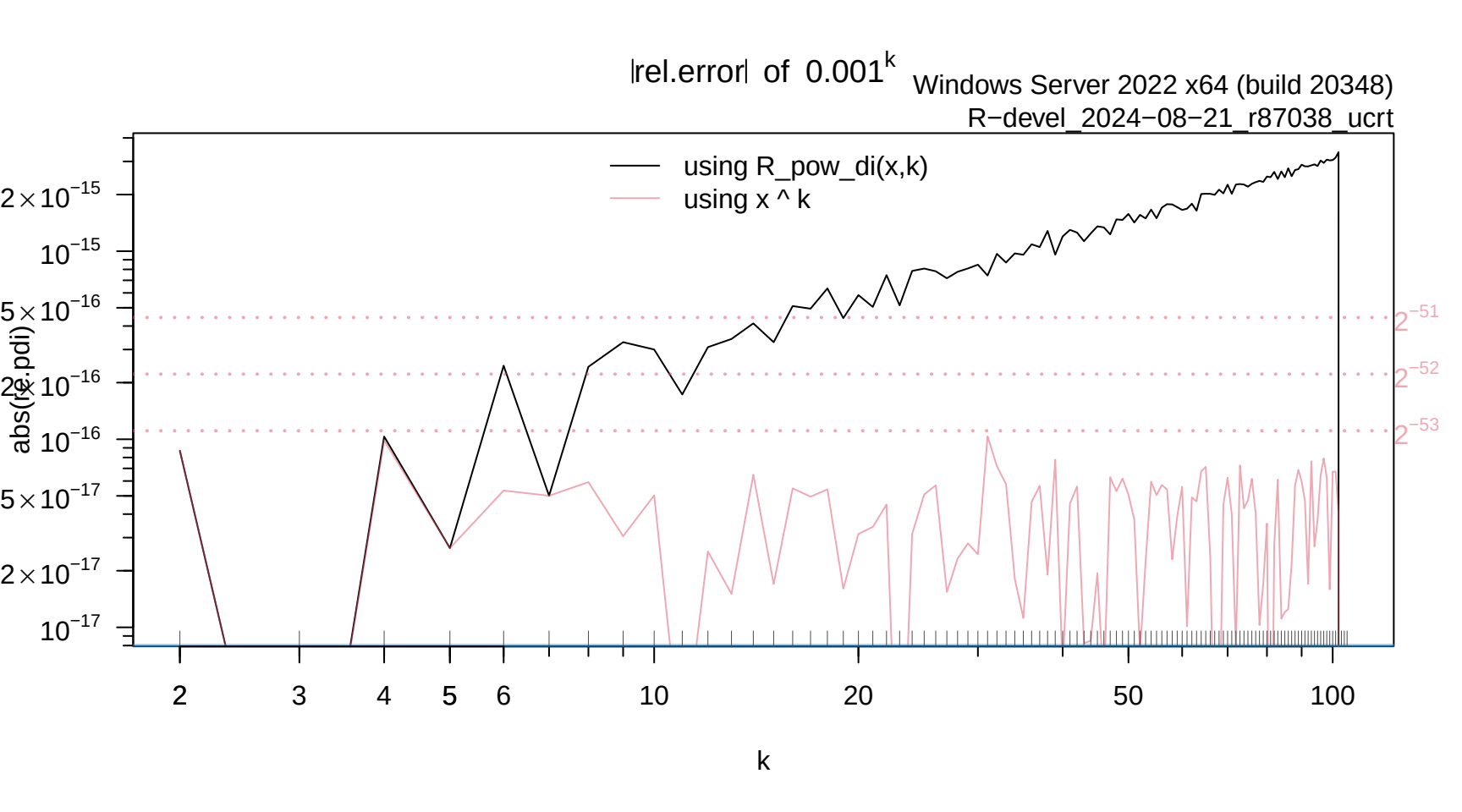

|rel.error| {wrt MPFR} of $(\frac{63}{64})^k$
using R_pow_di(x,k)
using x ^ k
abs(re1.pdi)
10^{-13}
10^{-14}
10^{-15}
10^{-16}
10^{-17}
2^{-51}
2^{-52}
2^{-53}
5
10
50
100
500
1000
5000
50000
k

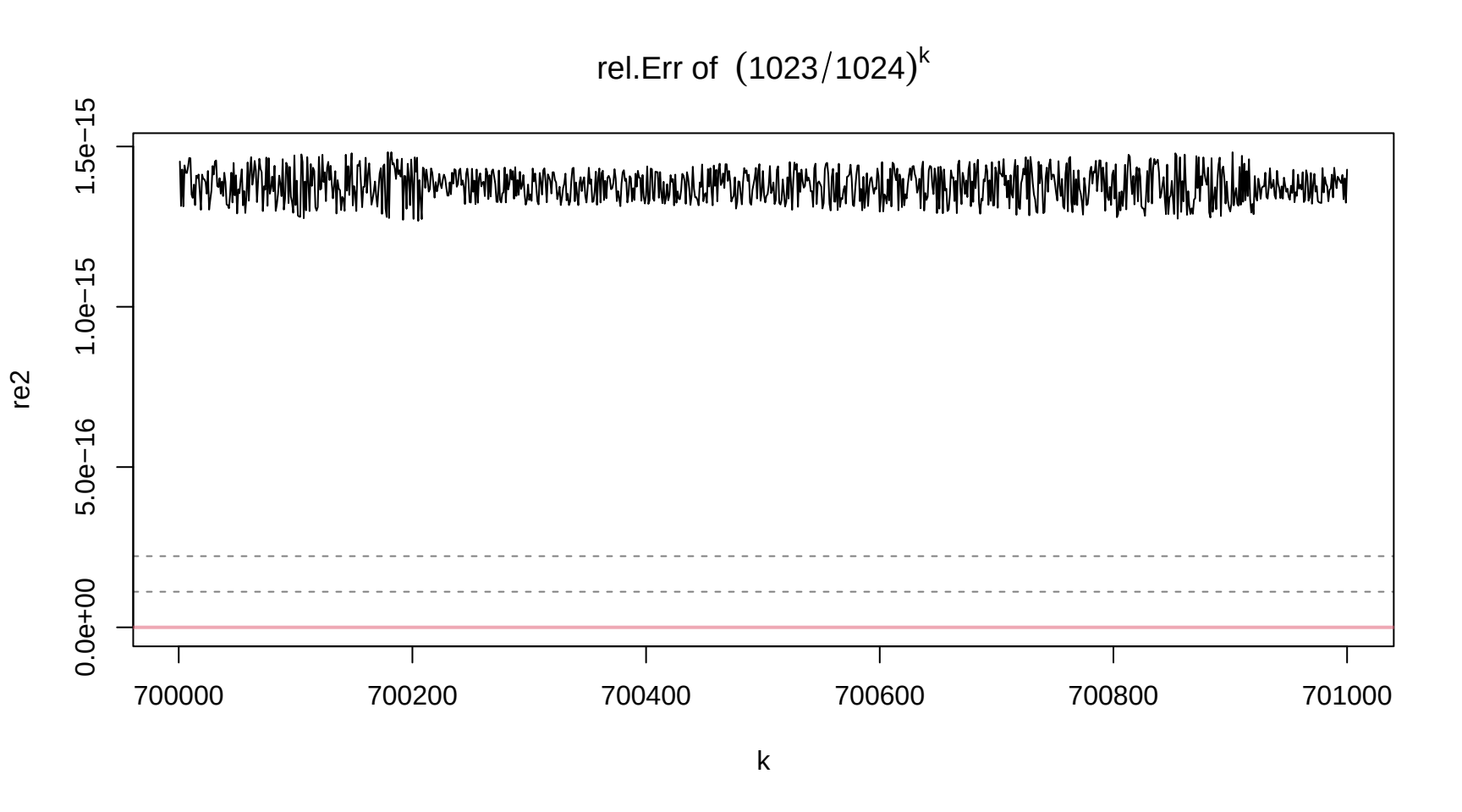

rel.error {wrt MPFR} of (63/64)^k
Windows Server 2022 x64 (build 20348)
R−devel_2024−08−21_r87038_ucrt
re1
0.0e+00
−1.0e−16
−2.0e−16
44300
44400
44500
44600
44700
44800
44900
45000
k1

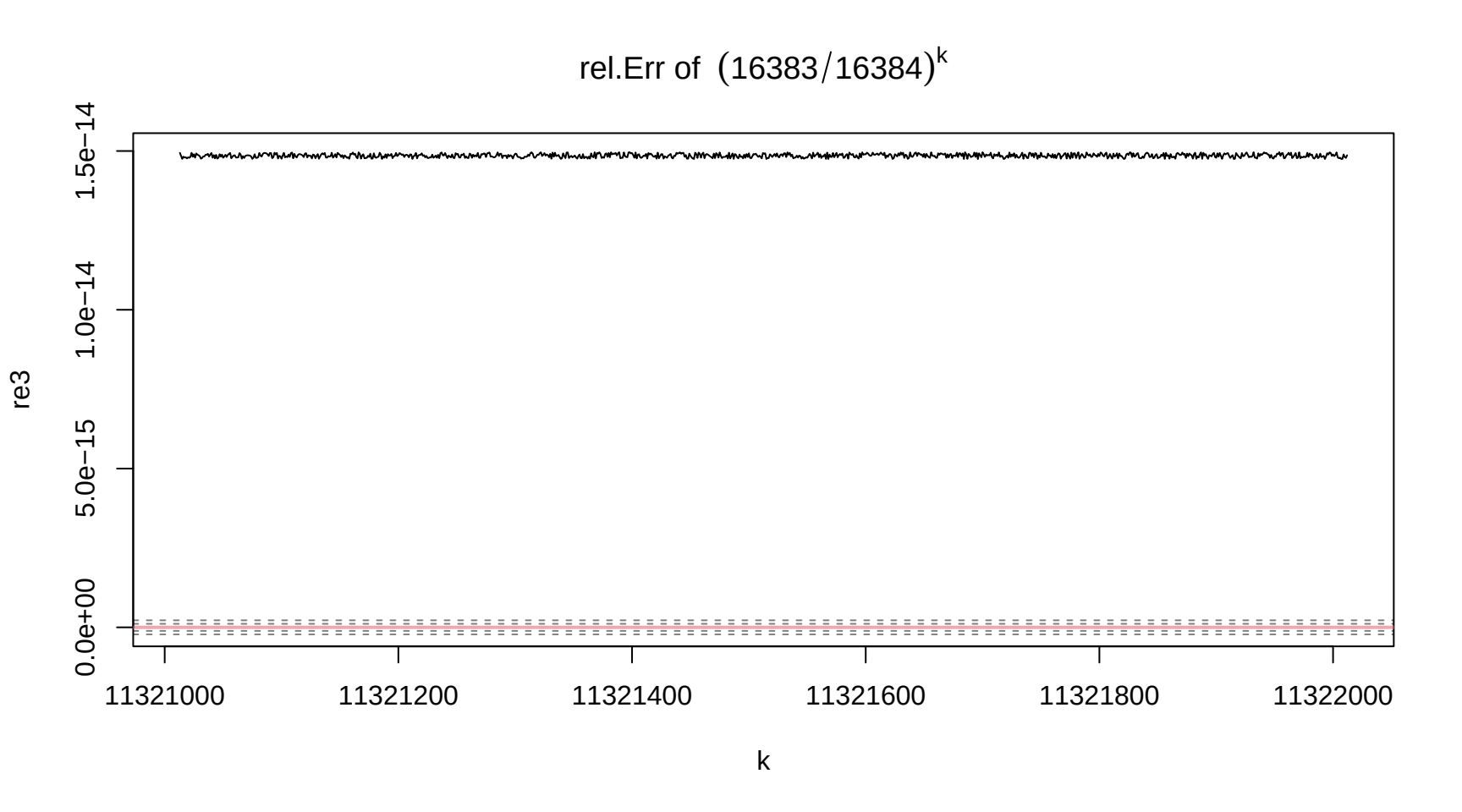

pk
1e−55
1e−181
1e−307
1e+01
1e+02
1e+03
1e+04
1e+05
1e+06
k

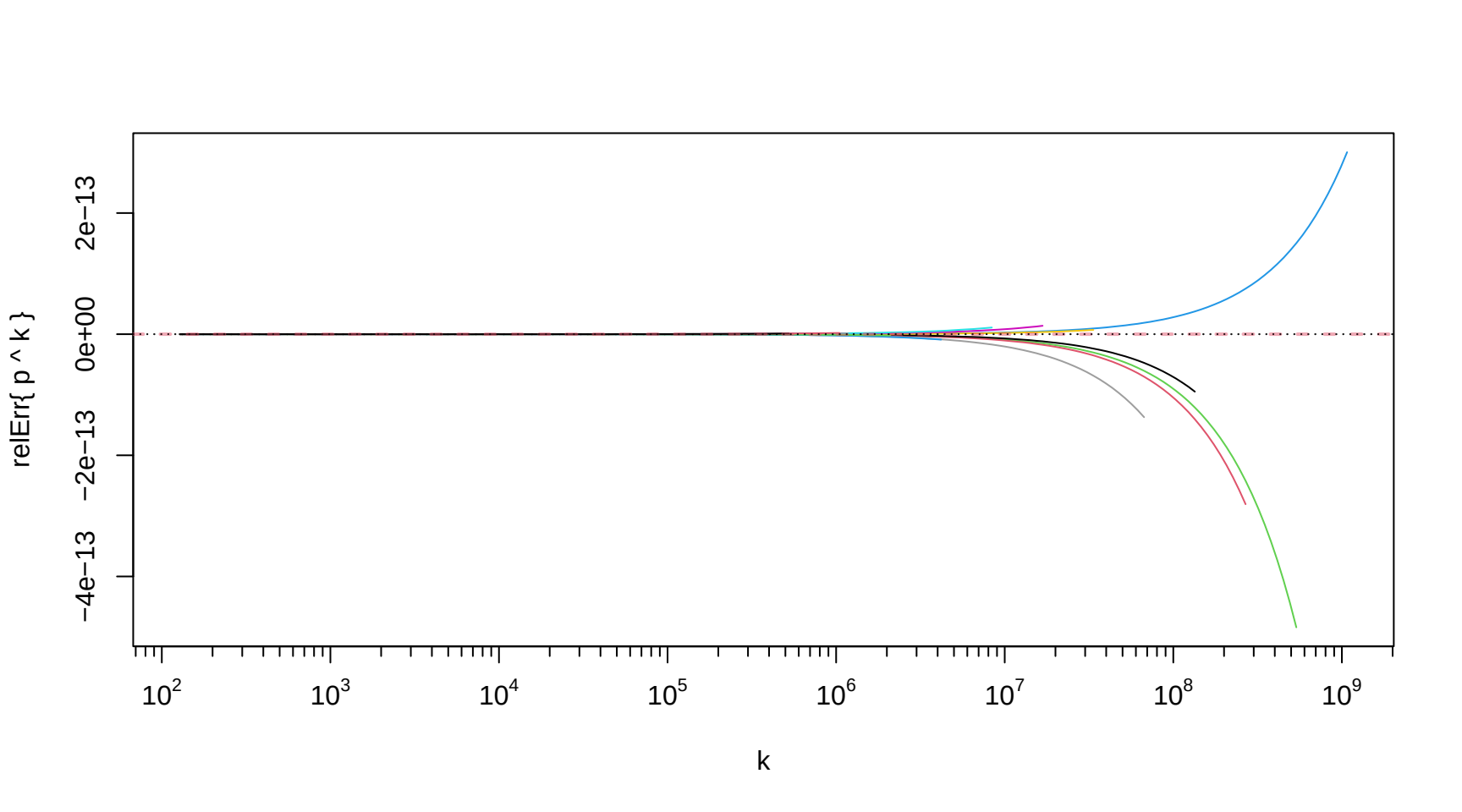

|rel.error| of 0.999^k
Windows Server 2022 x64 (build 20348)
R−devel_2024−08−21_r87038_ucrt
using R_pow_di(x,k)
using x ^ k
abs(re.pdi)
k
2
4
10
100
1000
10^4
10^5
10^6
10^−11
10^−12
10^−13
10^−14
10^−15
10^−16
10^−17
2^−51
2^−52
2^−53

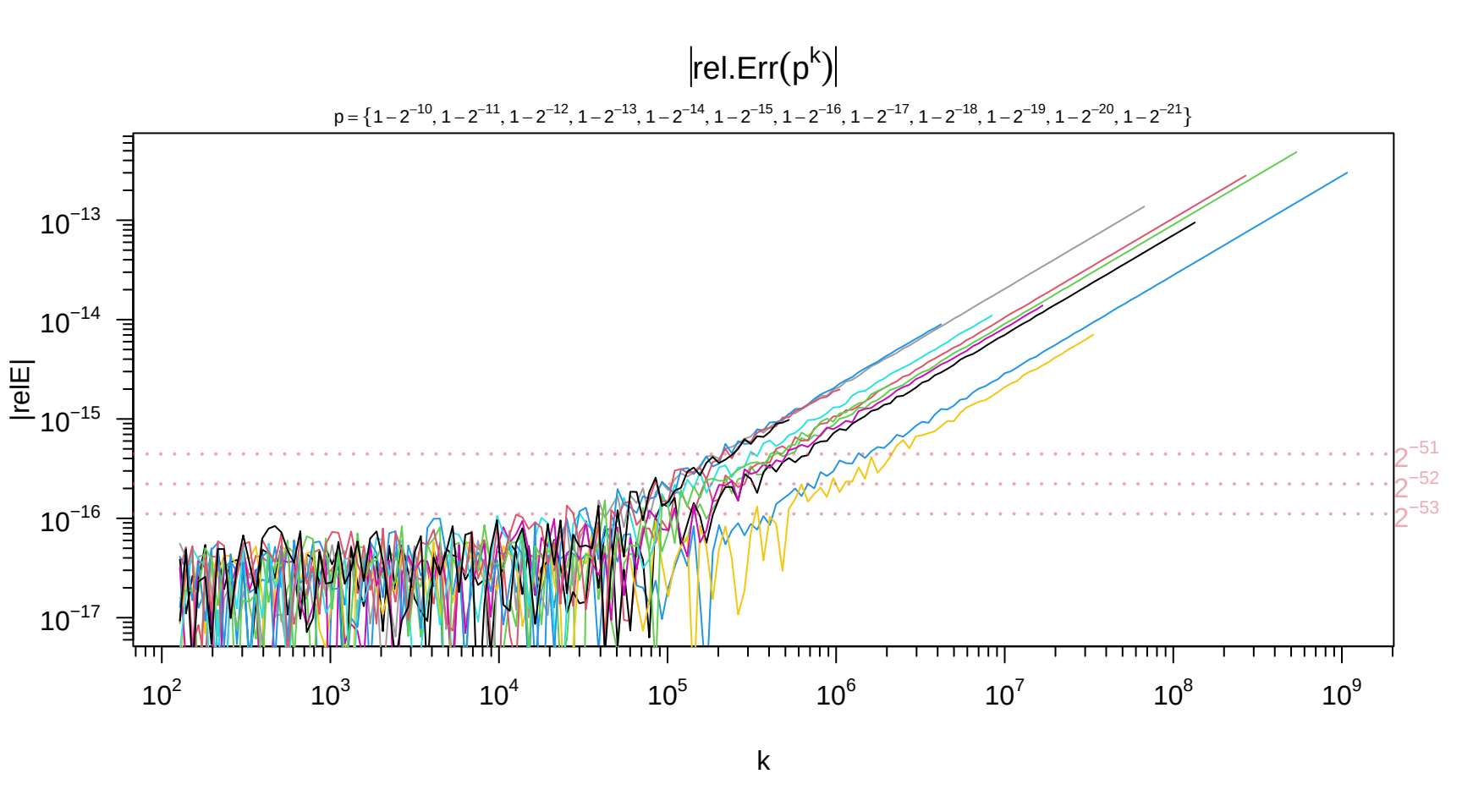

pk
1e+03
1e−59
1e−183
1e−307
2
5
10
20
50
100
k

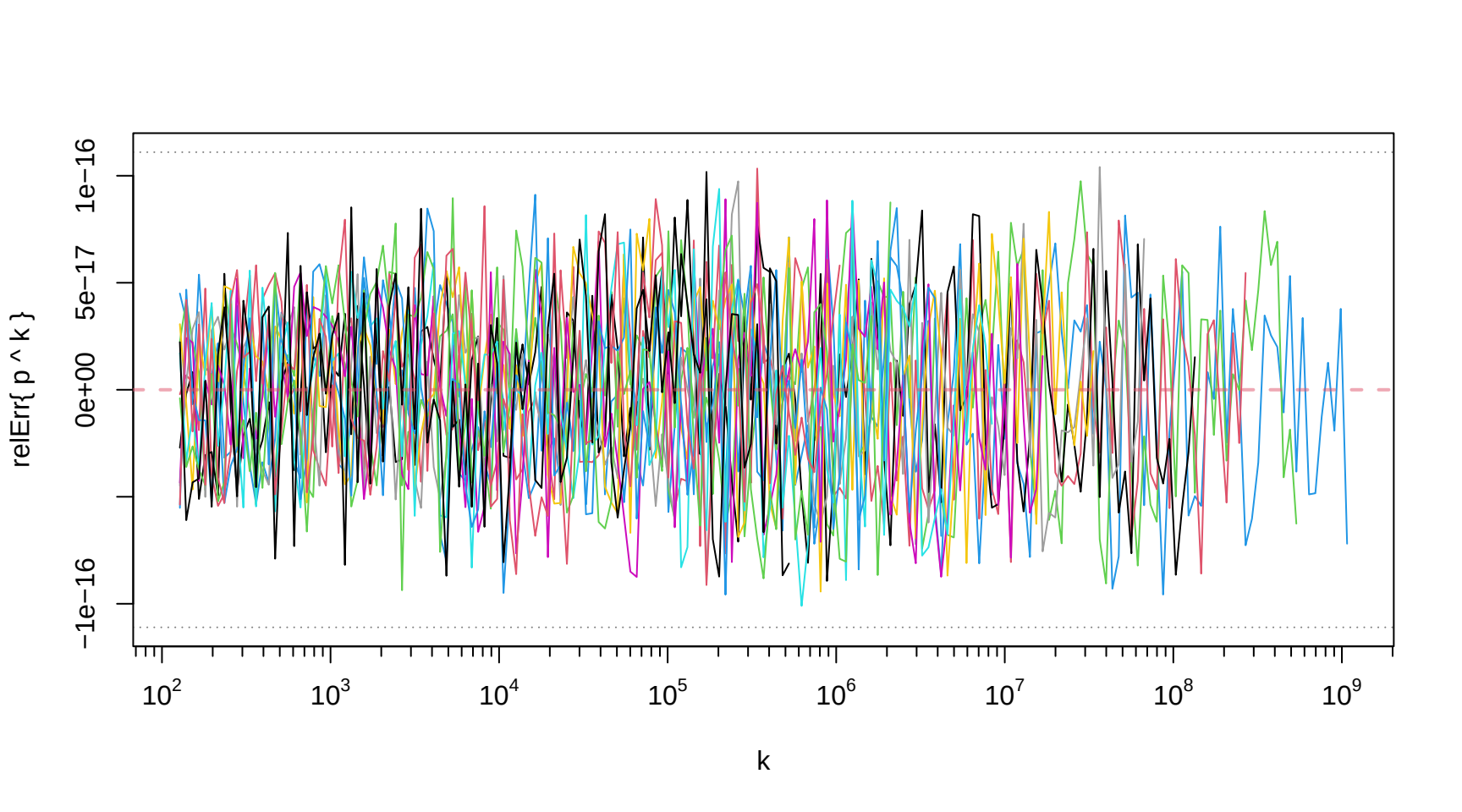

|rel.error| of 0.001^k
Windows Server 2022 x64 (build 20348)
R−devel_2024−08−21_r87038_ucrt
using R_pow_di(x,k)
using x ^ k
abs(x.pdi)
2×10^−15
10^−15
5×10^−16
2×10^−16
10^−16
5×10^−17
2×10^−17
10^−17
2^−51
2^−52
2^−53
2
3
4
5
6
10
20
50
100
k

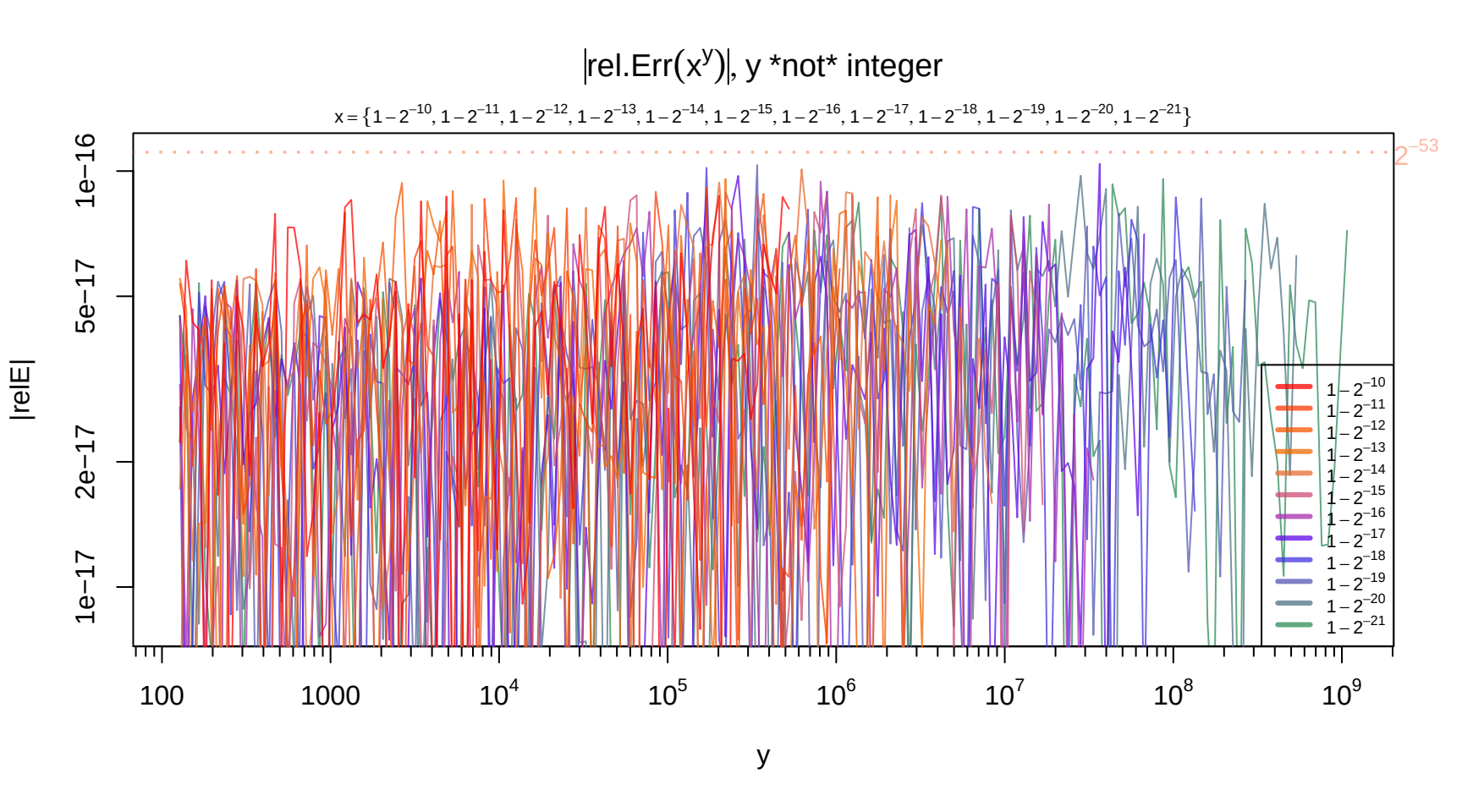

rel.Err of $(1023/1024)^k$
re2
1.5e−15
1.0e−15
5.0e−16
0.0e+00
700000
700200
700400
700600
700800
701000
k


rel.Err of $(16383/16384)^k$
re3
0.0e+00
5.0e−15
1.0e−14
1.5e−14
11321000
11321200
11321400
11321600
11321800
11322000
k


relErr{ p ^ k }
4e−13
2e−13
0e+00
−2e−13
−4e−13
10^2
10^3
10^4
10^5
10^6
10^7
10^8
10^9
k


$|\text{rel.Err}(p^k)|$
$p = \{1-2^{-10}, 1-2^{-11}, 1-2^{-12}, 1-2^{-13}, 1-2^{-14}, 1-2^{-15}, 1-2^{-16}, 1-2^{-17}, 1-2^{-18}, 1-2^{-19}, 1-2^{-20}, 1-2^{-21}\}$
|relE|
10^{-13}
10^{-14}
10^{-15}
10^{-16}
10^{-17}
2^{-51}
2^{-52}
2^{-53}
10^2
10^3
10^4
10^5
10^6
10^7
10^8
10^9
k


relErr{ p ^ k }
1e−16
5e−17
0e+00
−1e−16
10^2
10^3
10^4
10^5
10^6
10^7
10^8
10^9
k


|rel.Err(x^y)|, y *not* integer
x = {1 − 2^−10, 1 − 2^−11, 1 − 2^−12, 1 − 2^−13, 1 − 2^−14, 1 − 2^−15, 1 − 2^−16, 1 − 2^−17, 1 − 2^−18, 1 − 2^−19, 1 − 2^−20, 1 − 2^−21}
2^−53
|relE|
1e−16
5e−17
2e−17
1e−17
100
1000
10^4
10^5
10^6
10^7
10^8
10^9
y
1 − 2^−10
1 − 2^−11
1 − 2^−12
1 − 2^−13
1 − 2^−14
1 − 2^−15
1 − 2^−16
1 − 2^−17
1 − 2^−18
1 − 2^−19
1 − 2^−20
1 − 2^−21