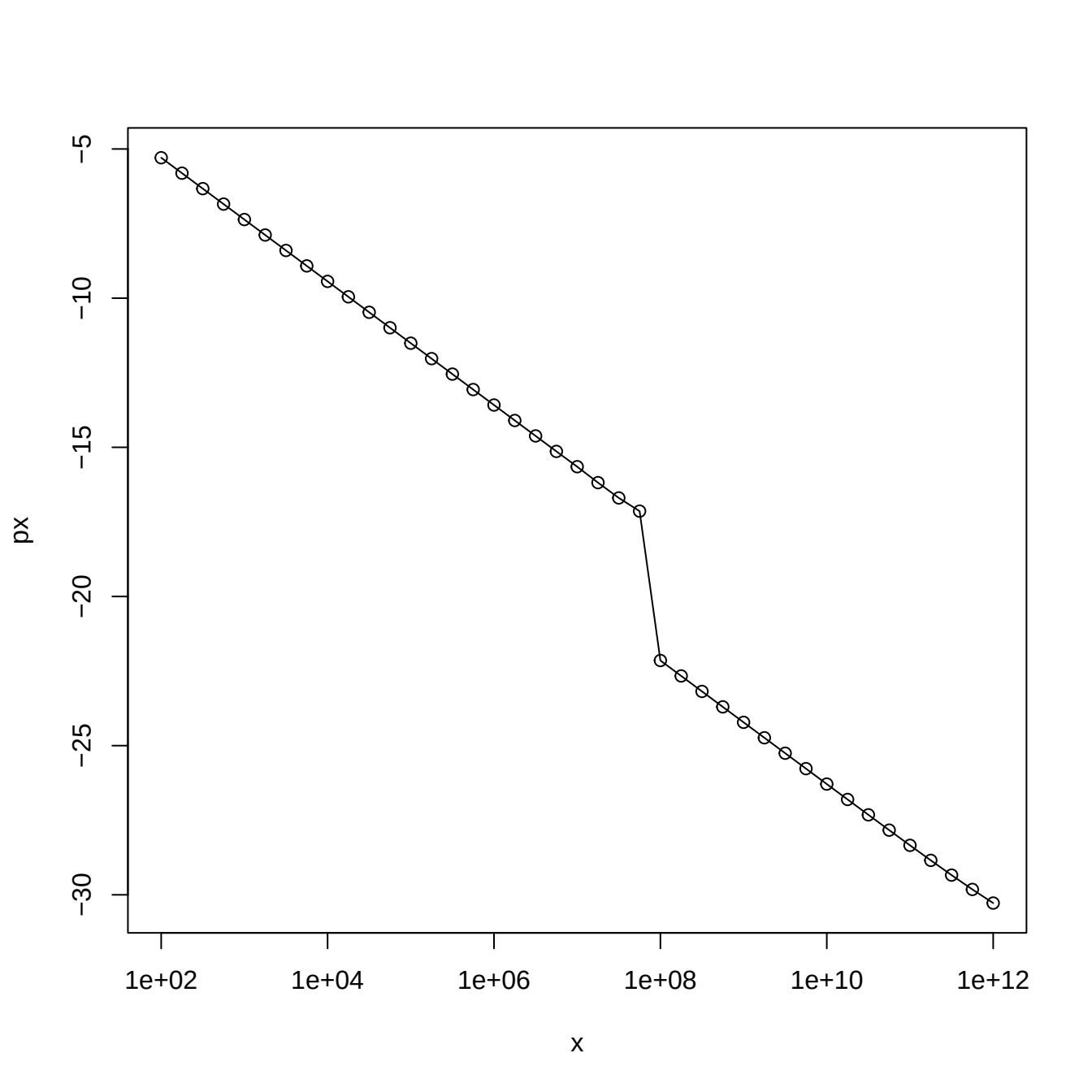
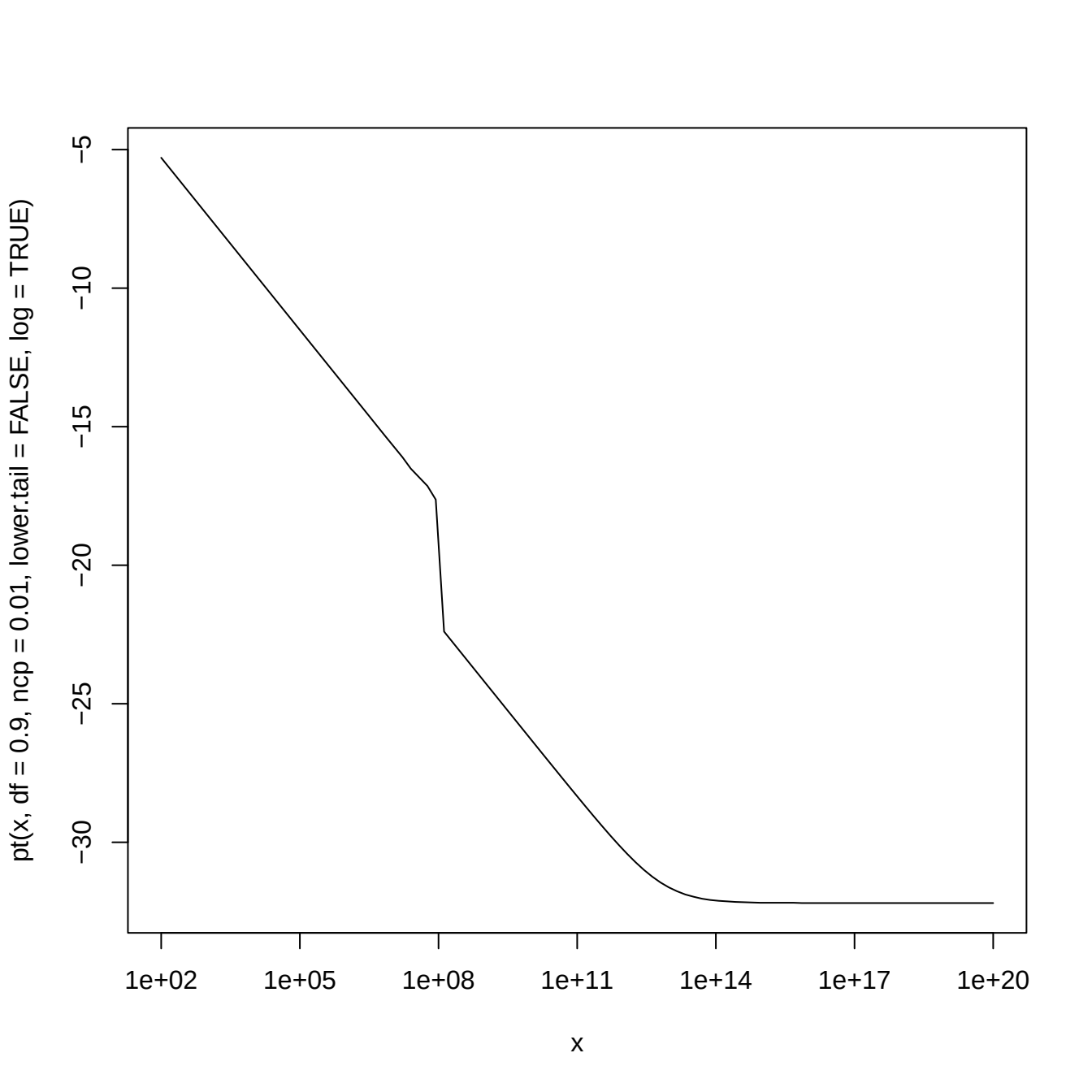
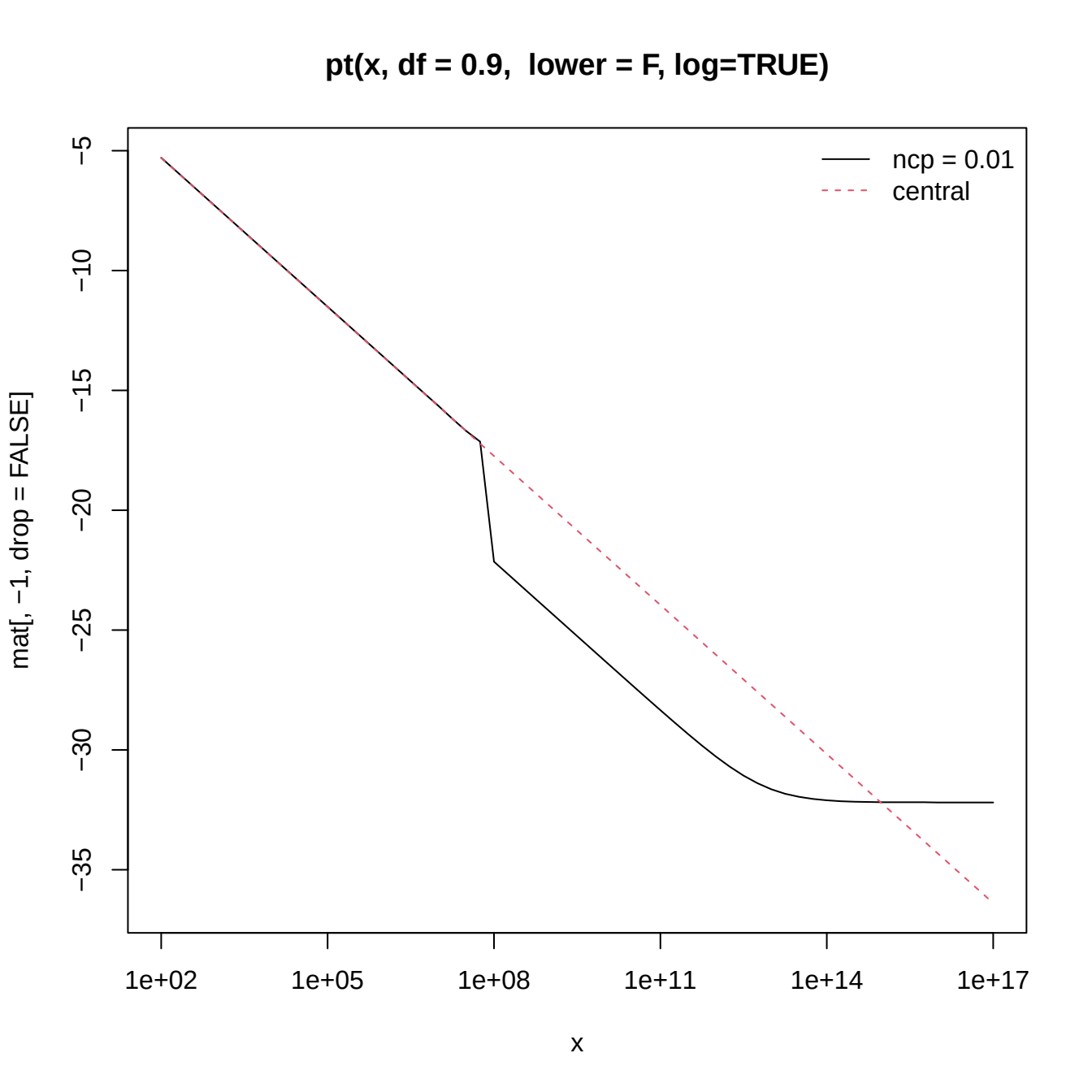
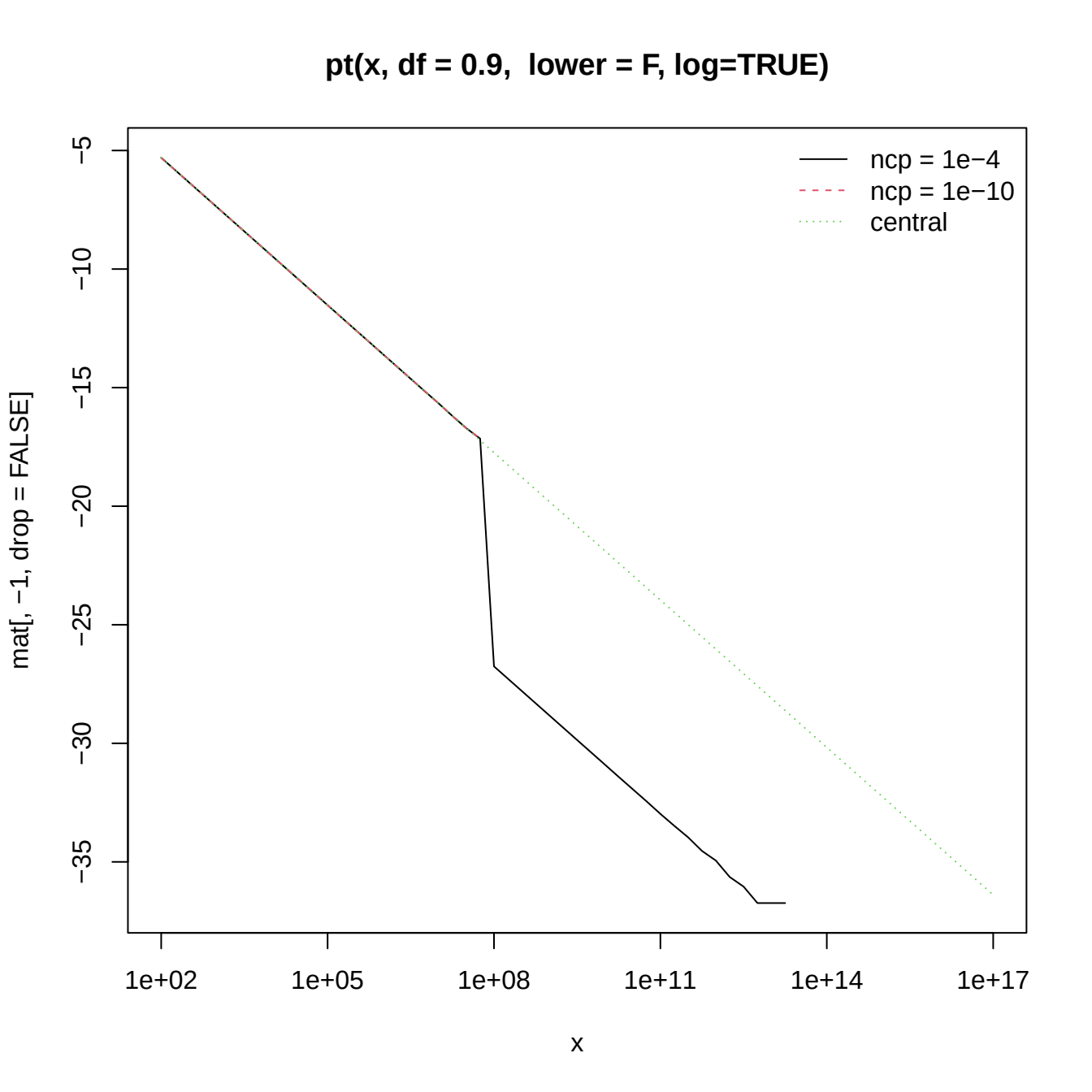
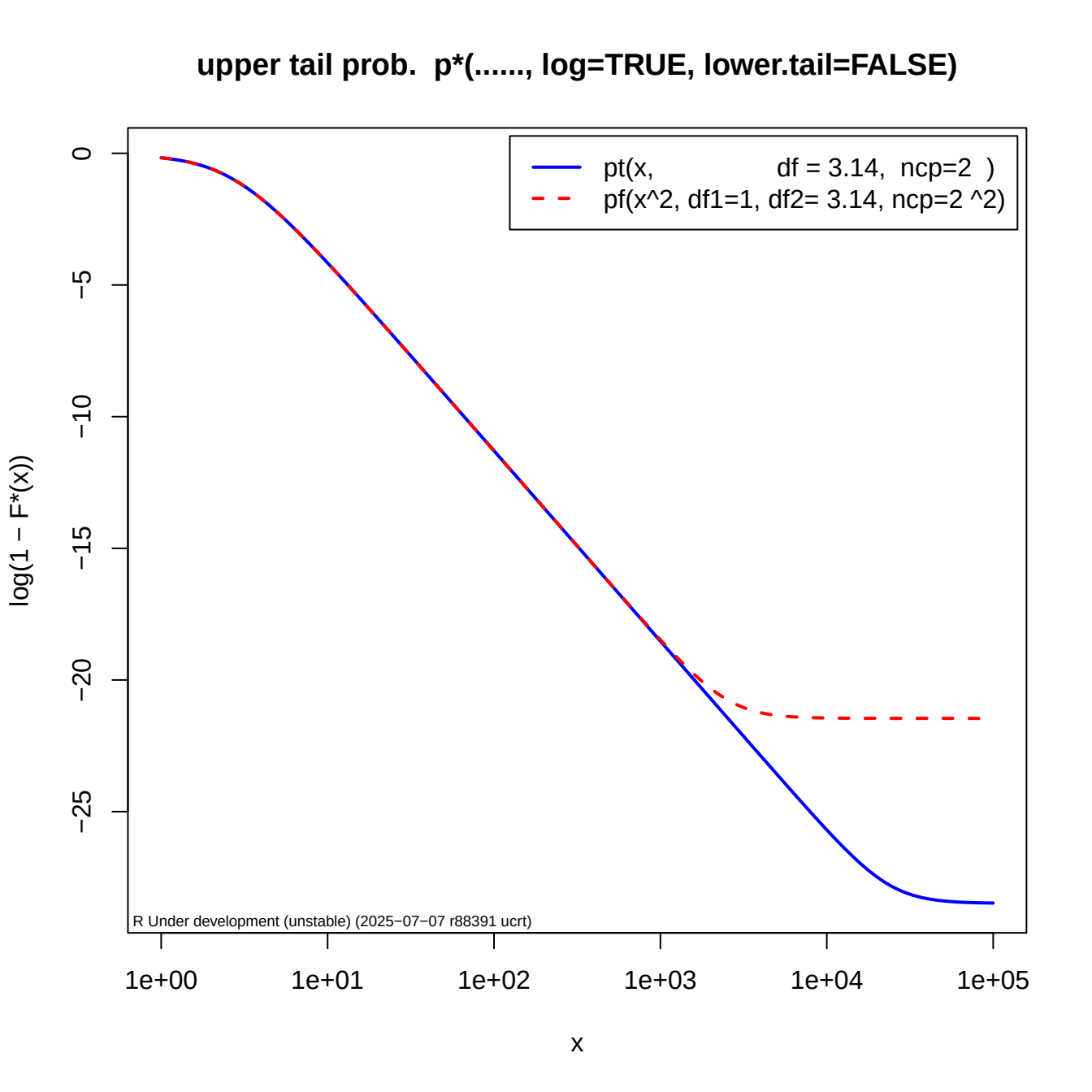
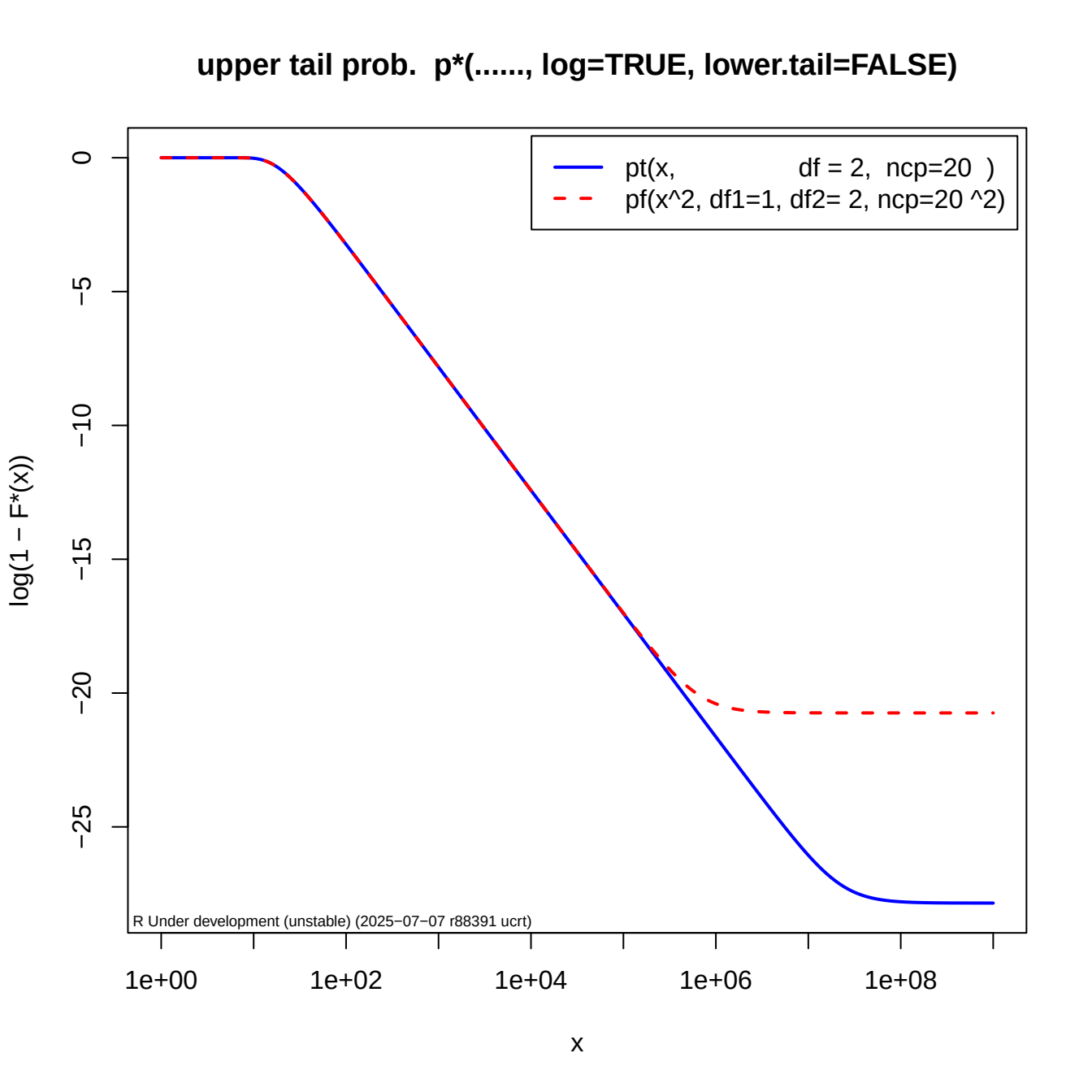

px
−5
−10
−15
−20
−25
−30
1e+02
1e+04
1e+06
1e+08
1e+10
1e+12
x

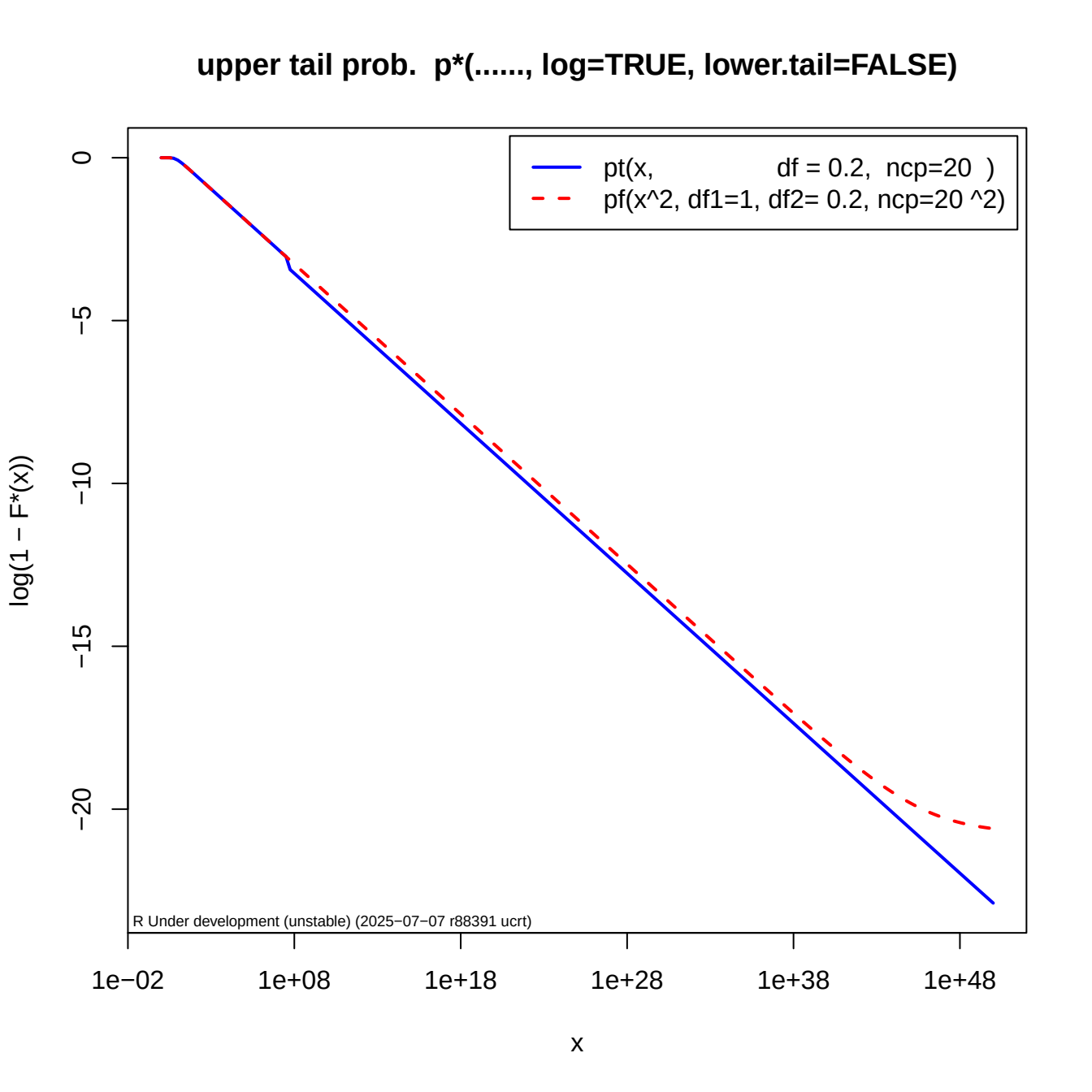

pt(x, df = 0.9, ncp = 0.01, lower.tail = FALSE, log = TRUE)
−5
−10
−15
−20
−25
−30
1e+02
1e+05
1e+08
1e+11
1e+14
1e+17
1e+20
x

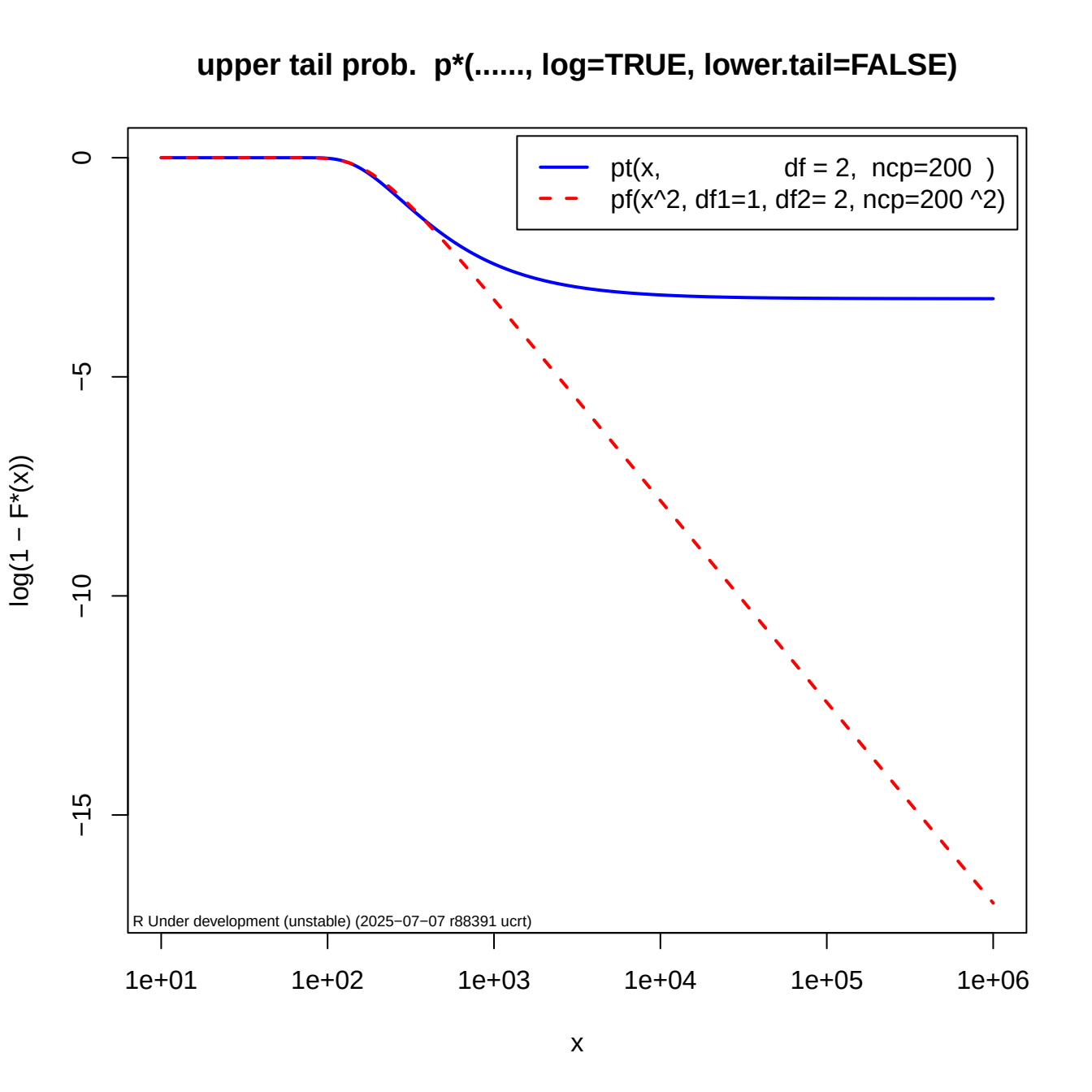

pt(x, df = 0.9, lower = F, log=TRUE)
ncp = 0.01
central
mat[, −1, drop = FALSE]
−5
−10
−15
−20
−25
−30
−35
1e+02
1e+05
1e+08
1e+11
1e+14
1e+17
x

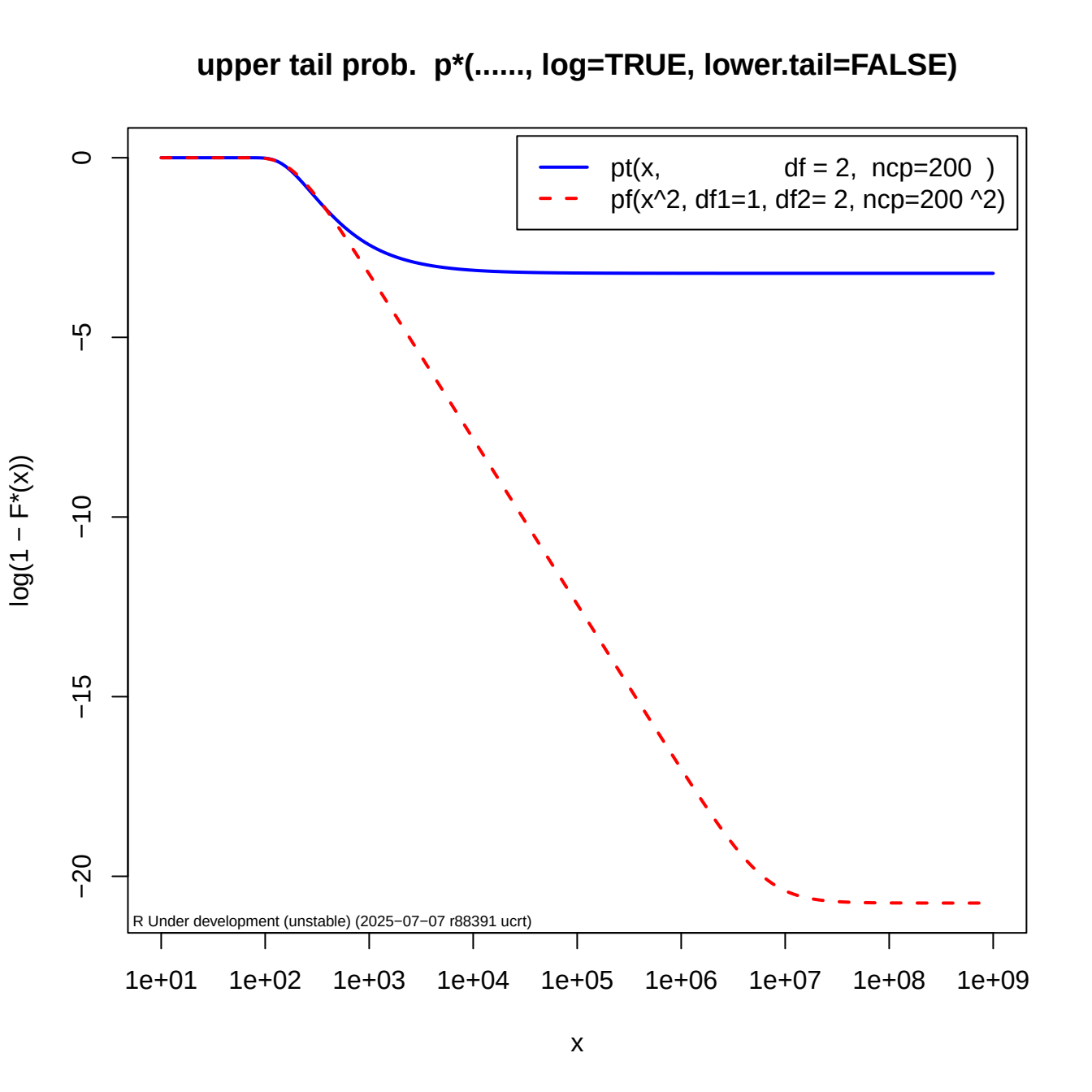

pt(x, df = 0.9, lower = F, log=TRUE)
ncp = 1e−4
ncp = 1e−10
central
mat[, −1, drop = FALSE]
−5
−10
−15
−20
−25
−30
−35
1e+02
1e+05
1e+08
1e+11
1e+14
1e+17
x

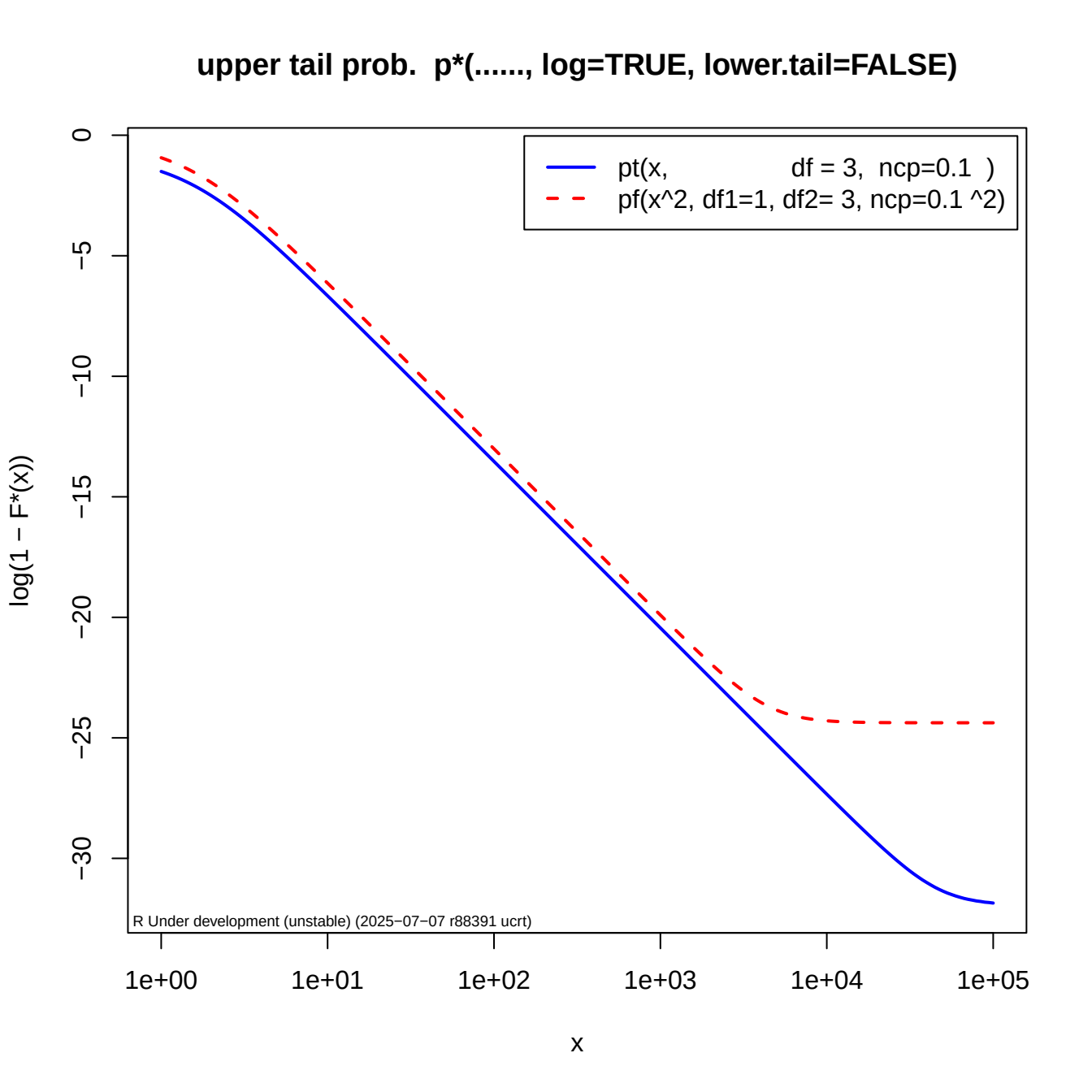

upper tail prob. p*(....., log=TRUE, lower.tail=FALSE)
pt(x, df = 3.14, ncp=2)
pf(x^2, df1=1, df2= 3.14, ncp=2 ^2)
log(1 − F*(x))
0
−5
−10
−15
−20
−25
R Under development (unstable) (2025−07−07 r88391 ucrt)
1e+00
1e+01
1e+02
1e+03
1e+04
1e+05
x

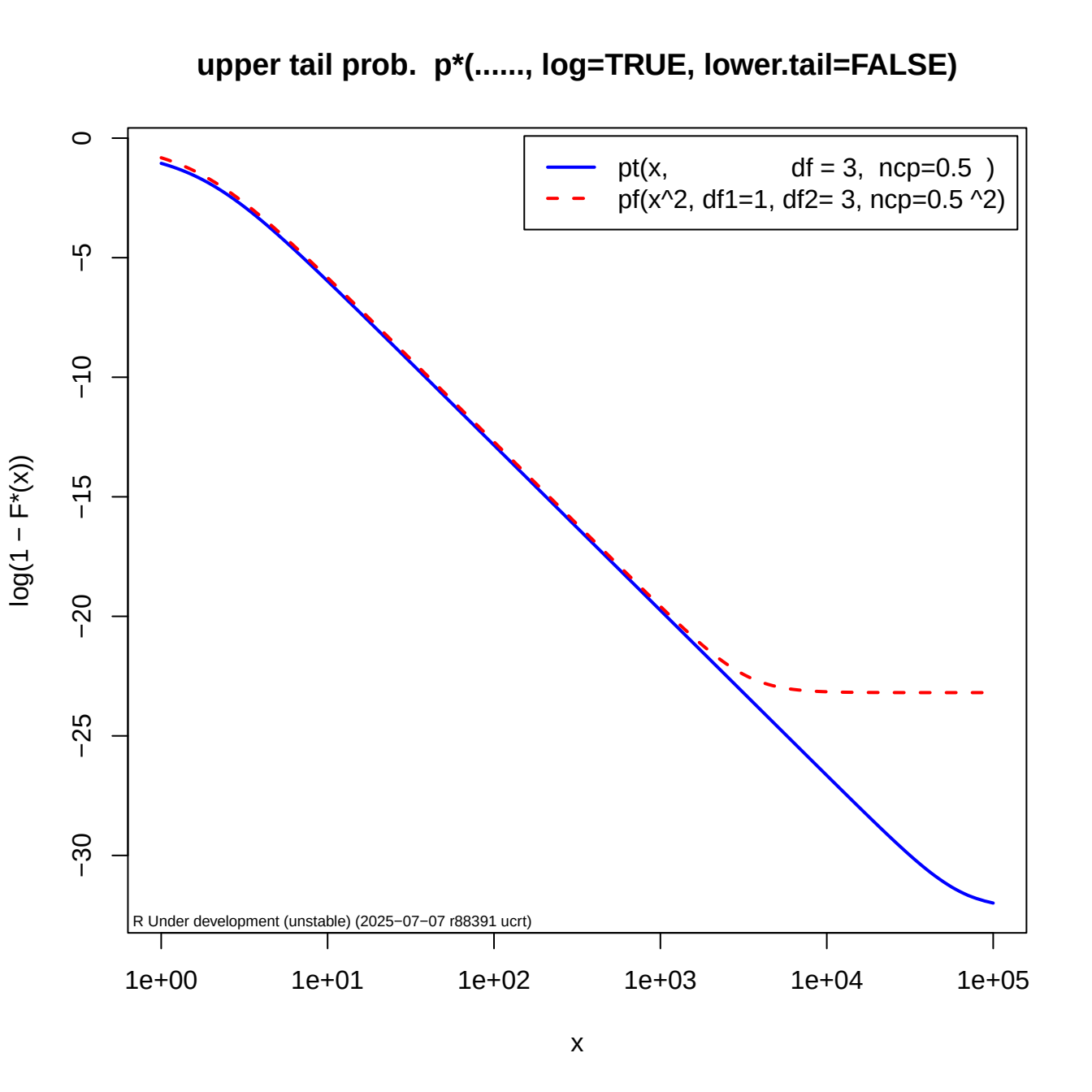

upper tail prob. p*(....., log=TRUE, lower.tail=FALSE)
pt(x, df = 2, ncp=20)
pf(x^2, df1=1, df2= 2, ncp=20 ^2)
log(1 − F*(x))
0
−5
−10
−15
−20
−25
1e+00
1e+02
1e+04
1e+06
1e+08
x
R Under development (unstable) (2025−07−07 r88391 ucrt)

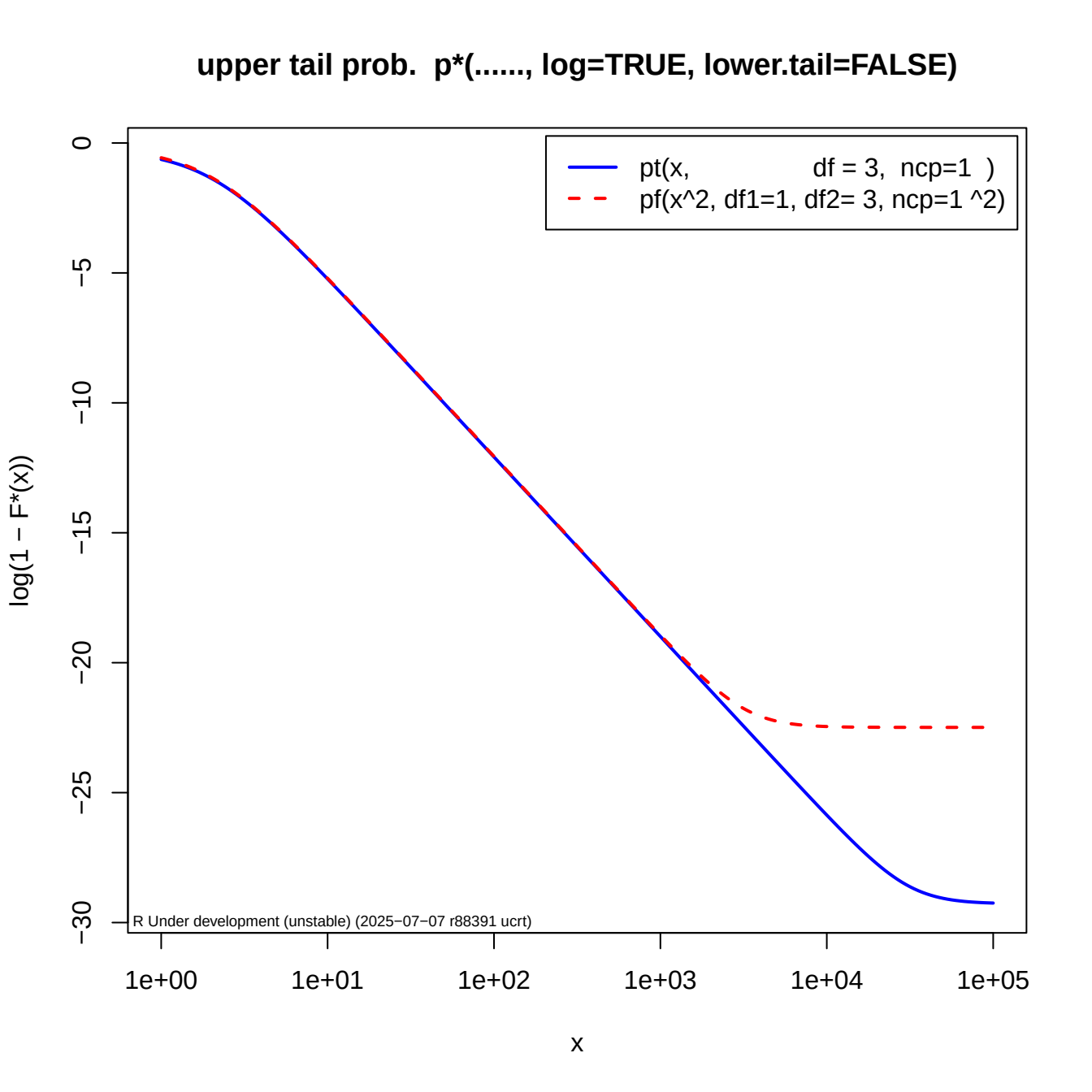

upper tail prob. p*(....., log=TRUE, lower.tail=FALSE)
pt(x, df = 0.2, ncp=20)
pf(x^2, df1=1, df2= 0.2, ncp=20 ^2)
log(1 − F*(x))
0
−5
−10
−15
−20
R Under development (unstable) (2025−07−07 r88391 ucrt)
1e−02
1e+08
1e+18
1e+28
1e+38
1e+48
x

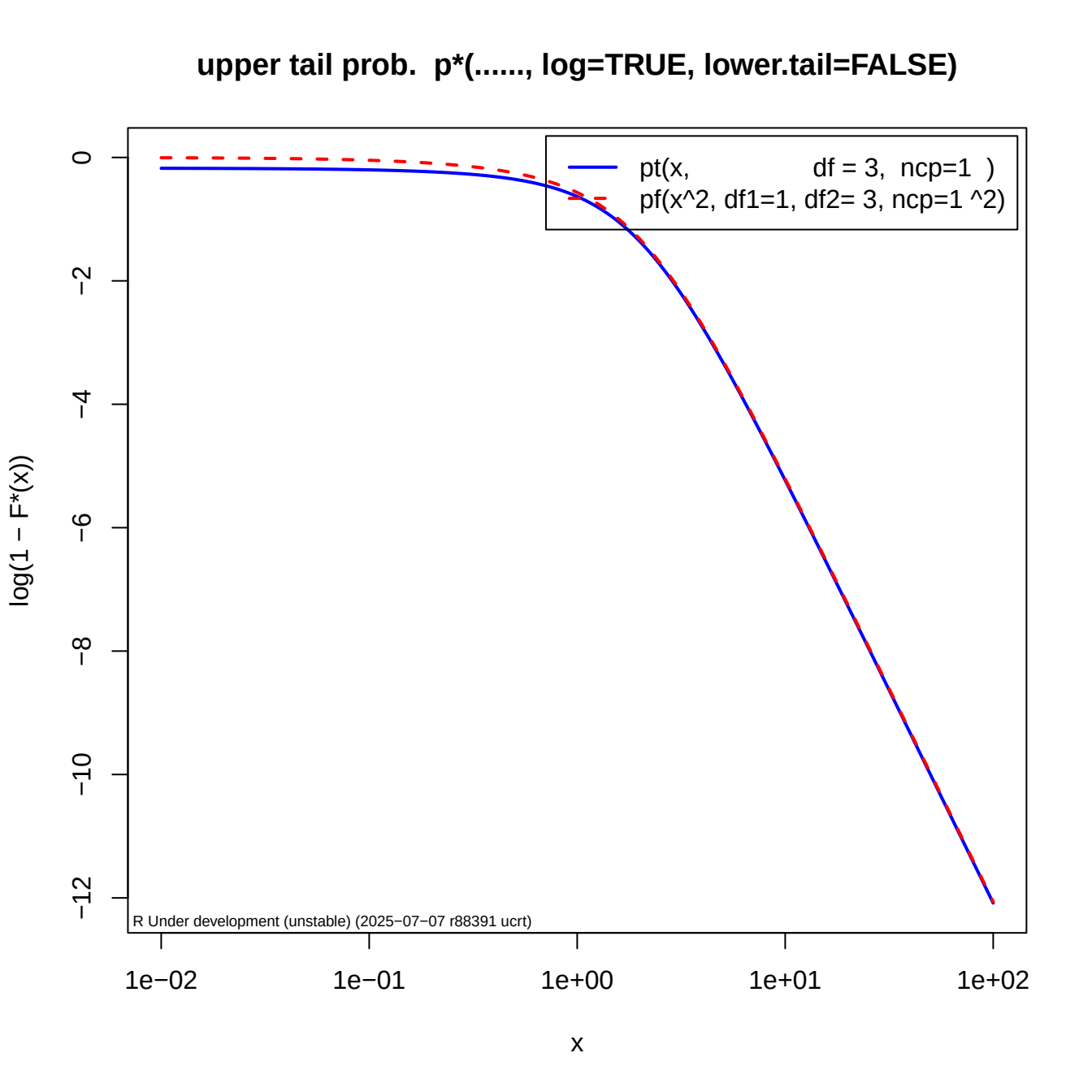

upper tail prob. p*(....., log=TRUE, lower.tail=FALSE)
pt(x, df = 2, ncp=200)
pf(x^2, df1=1, df2= 2, ncp=200 ^2)
log(1 − F*(x))
0
−5
−10
−15
1e+01
1e+02
1e+03
1e+04
1e+05
1e+06
x
R Under development (unstable) (2025−07−07 r88391 ucrt)

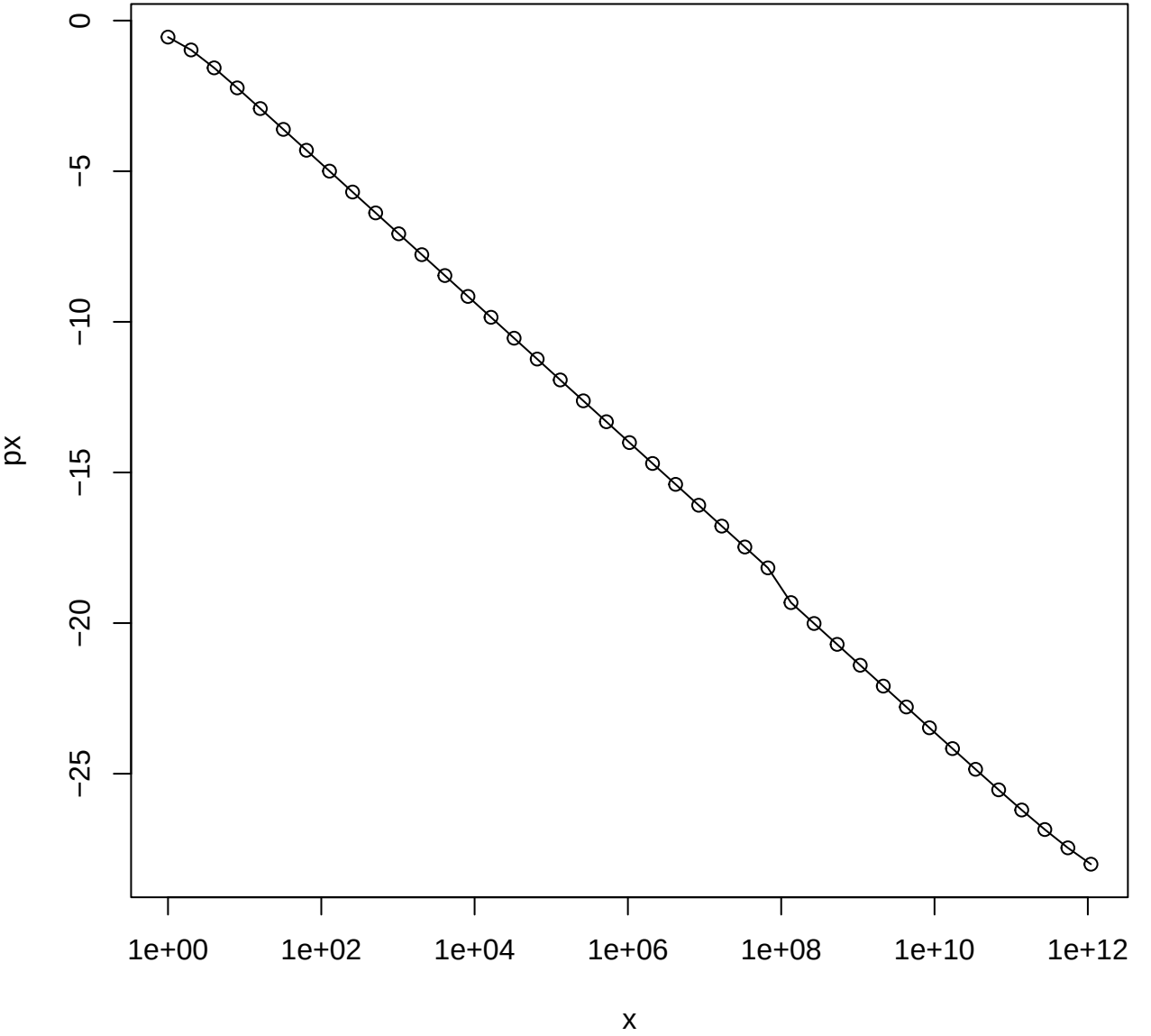

upper tail prob. p*(....., log=TRUE, lower.tail=FALSE)
pt(x, df = 2, ncp=200)
pf(x^2, df1=1, df2= 2, ncp=200 ^2)
log(1 − F*(x))
0
−5
−10
−15
−20
R Under development (unstable) (2025−07−07 r88391 ucrt)
1e+01
1e+02
1e+03
1e+04
1e+05
1e+06
1e+07
1e+08
1e+09
x

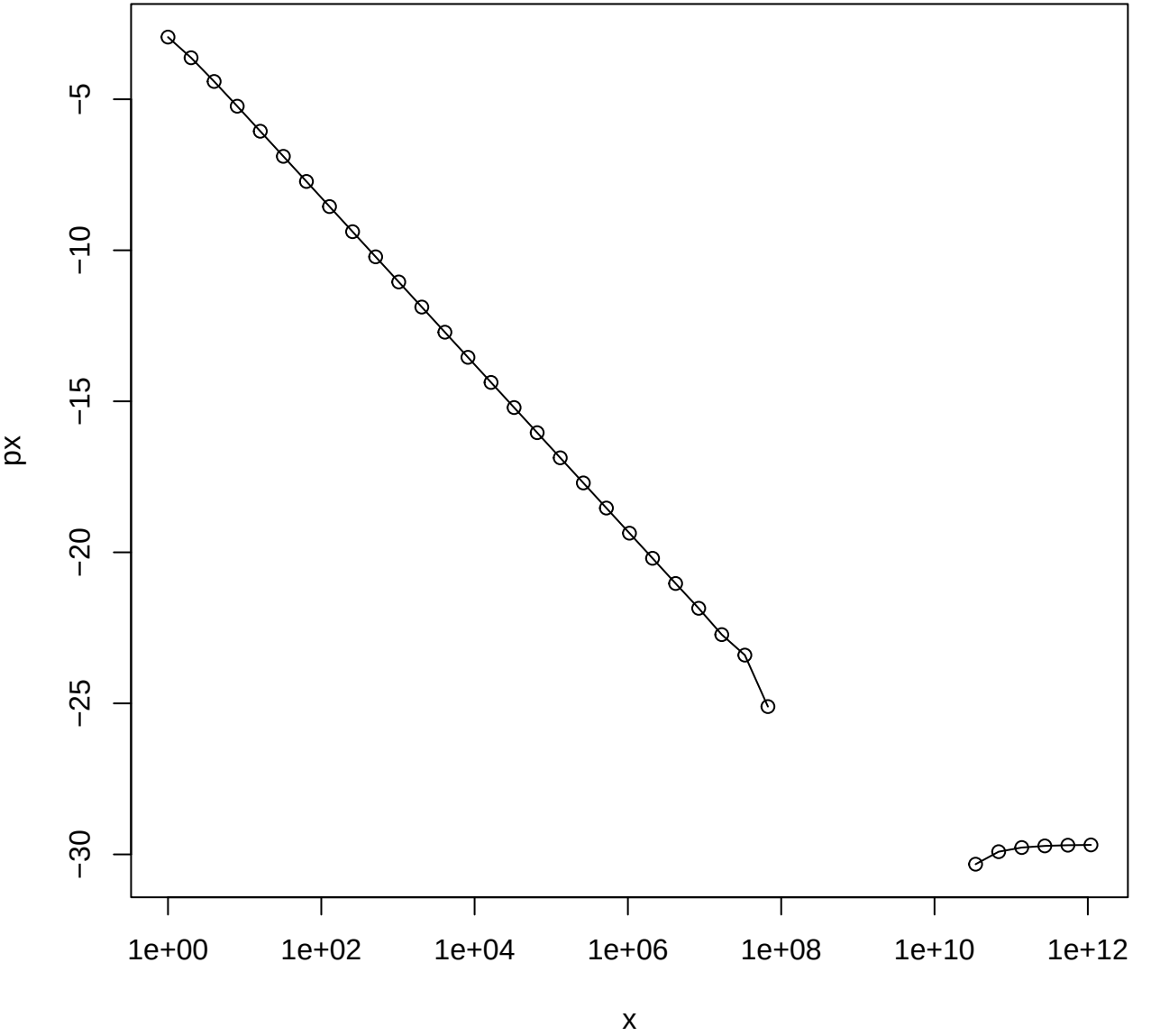

upper tail prob. p*(....., log=TRUE, lower.tail=FALSE)
pt(x, df = 3, ncp=0.1)
pf(x^2, df1=1, df2= 3, ncp=0.1 ^2)
log(1 − F*(x))
0
−5
−10
−15
−20
−25
−30
R Under development (unstable) (2025−07−07 r88391 ucrt)
1e+00
1e+01
1e+02
1e+03
1e+04
1e+05
x

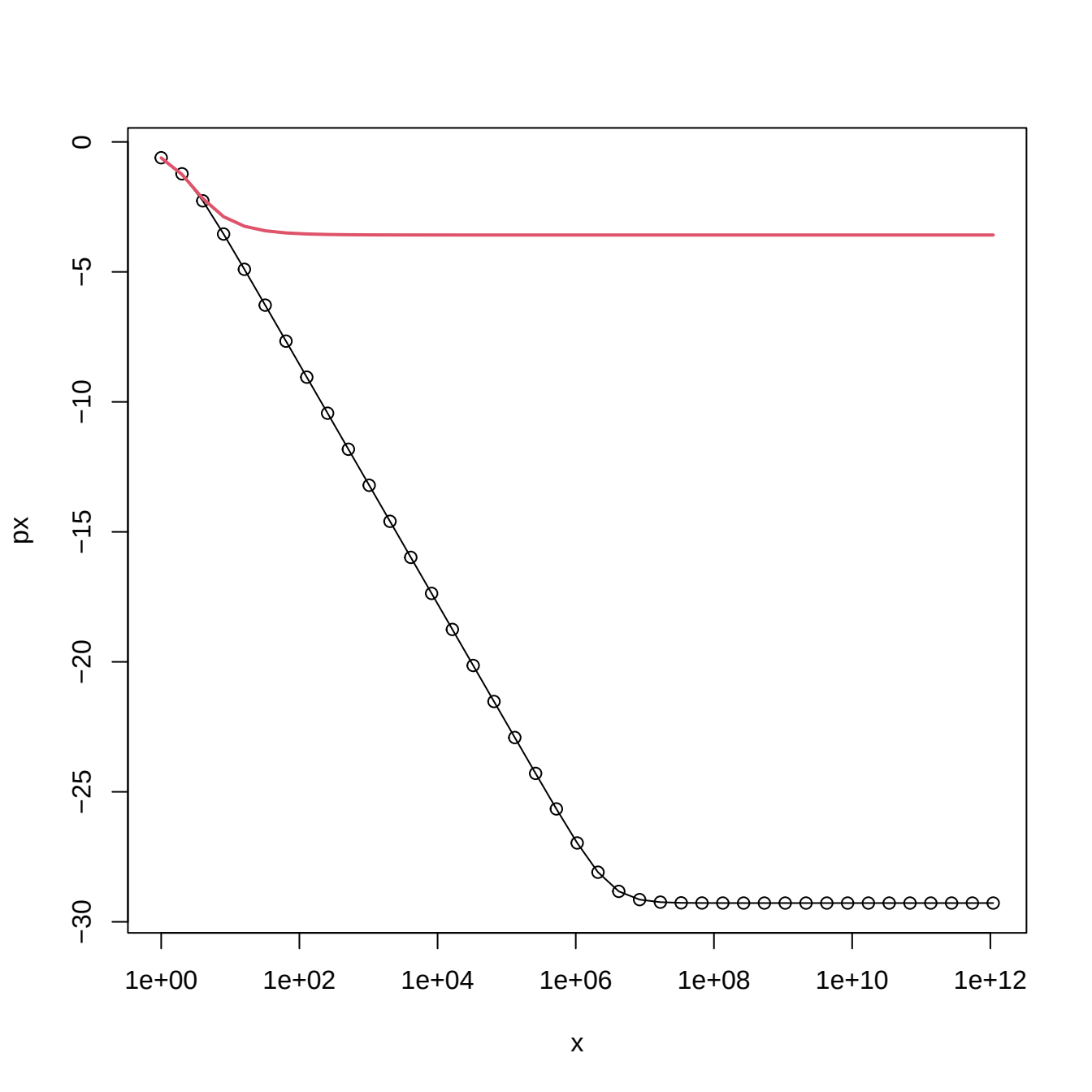

upper tail prob. p*(....., log=TRUE, lower.tail=FALSE)
pt(x, df = 3, ncp=0.5)
pf(x^2, df1=1, df2= 3, ncp=0.5 ^2)
log(1 − F*(x))
0
−5
−10
−15
−20
−25
−30
R Under development (unstable) (2025−07−07 r88391 ucrt)
1e+00
1e+01
1e+02
1e+03
1e+04
1e+05
x

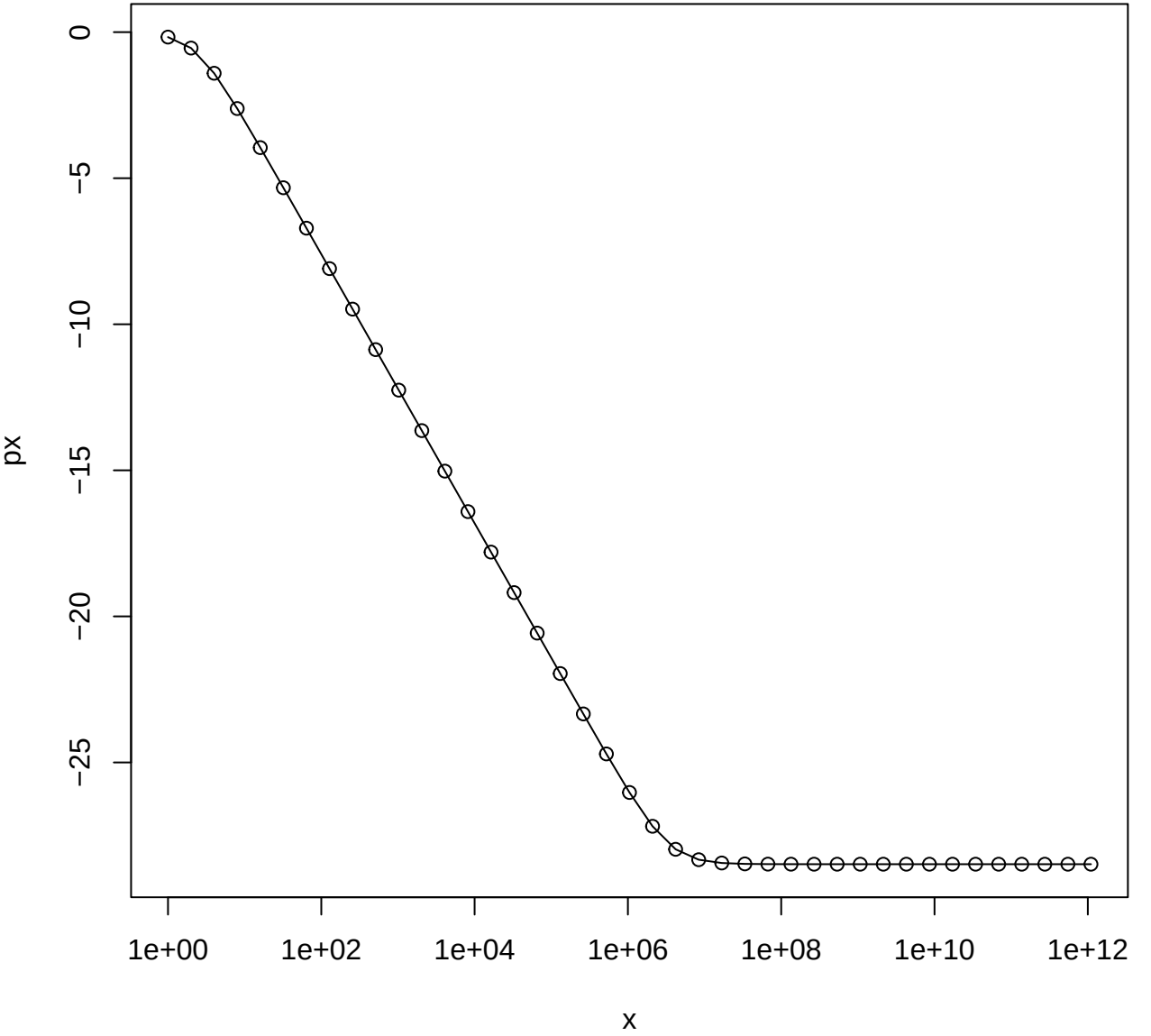

upper tail prob. p*(....., log=TRUE, lower.tail=FALSE)
pt(x, df = 3, ncp=1)
pf(x^2, df1=1, df2= 3, ncp=1 ^2)
log(1 − F*(x))
0
−5
−10
−15
−20
−25
−30
R Under development (unstable) (2025−07−07 r88391 ucrt)
1e+00
1e+01
1e+02
1e+03
1e+04
1e+05
x

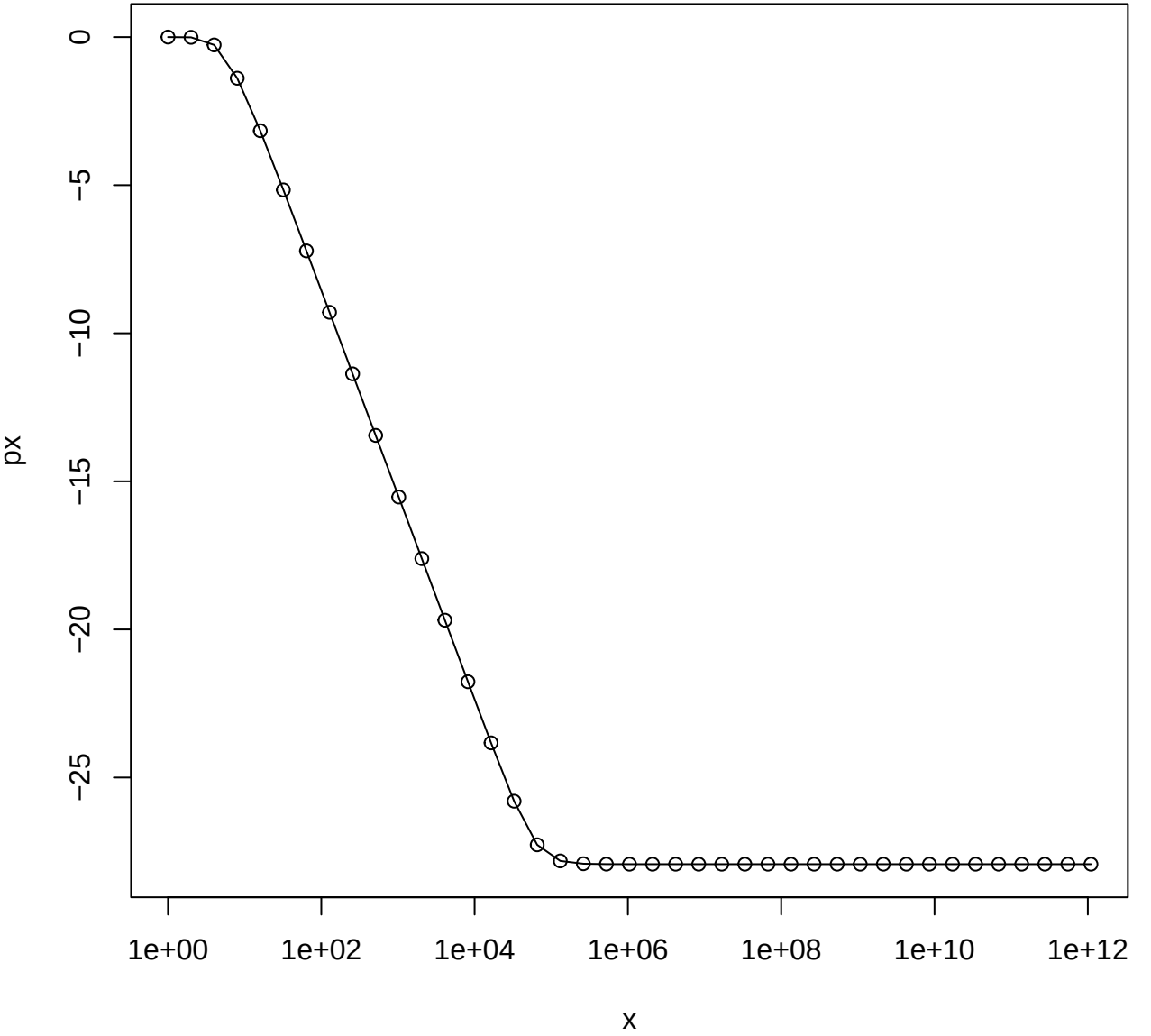

upper tail prob. p*(....., log=TRUE, lower.tail=FALSE)
pt(x, df = 3, ncp=1)
pf(x^2, df1=1, df2= 3, ncp=1 ^2)
log(1 − F*(x))
0
−2
−4
−6
−8
−10
−12
R Under development (unstable) (2025−07−07 r88391 ucrt)
1e−02
1e−01
1e+00
1e+01
1e+02
x

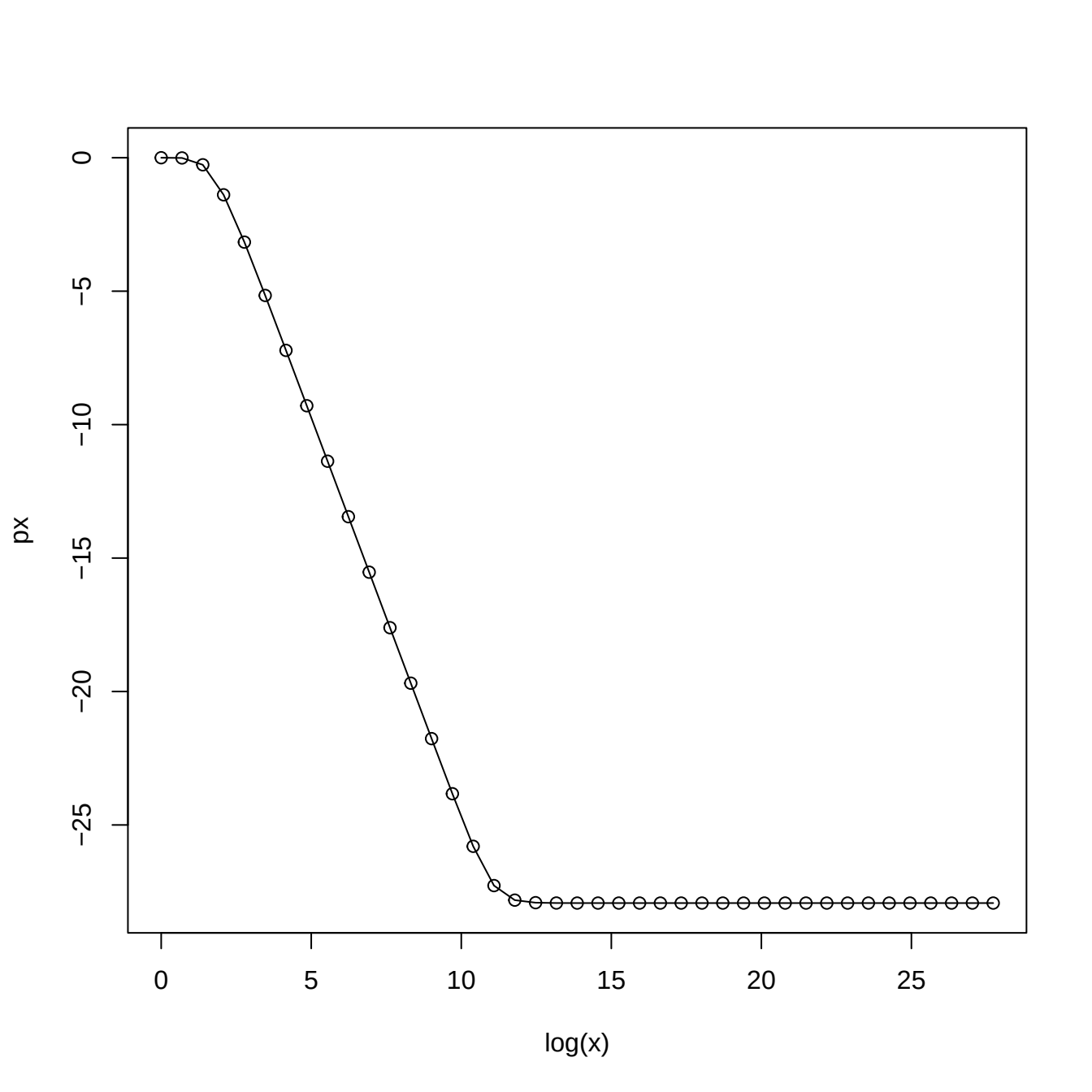

0
−5
−10
−15
−20
−25
px
1e+00
1e+02
1e+04
1e+06
1e+08
1e+10
1e+12
x

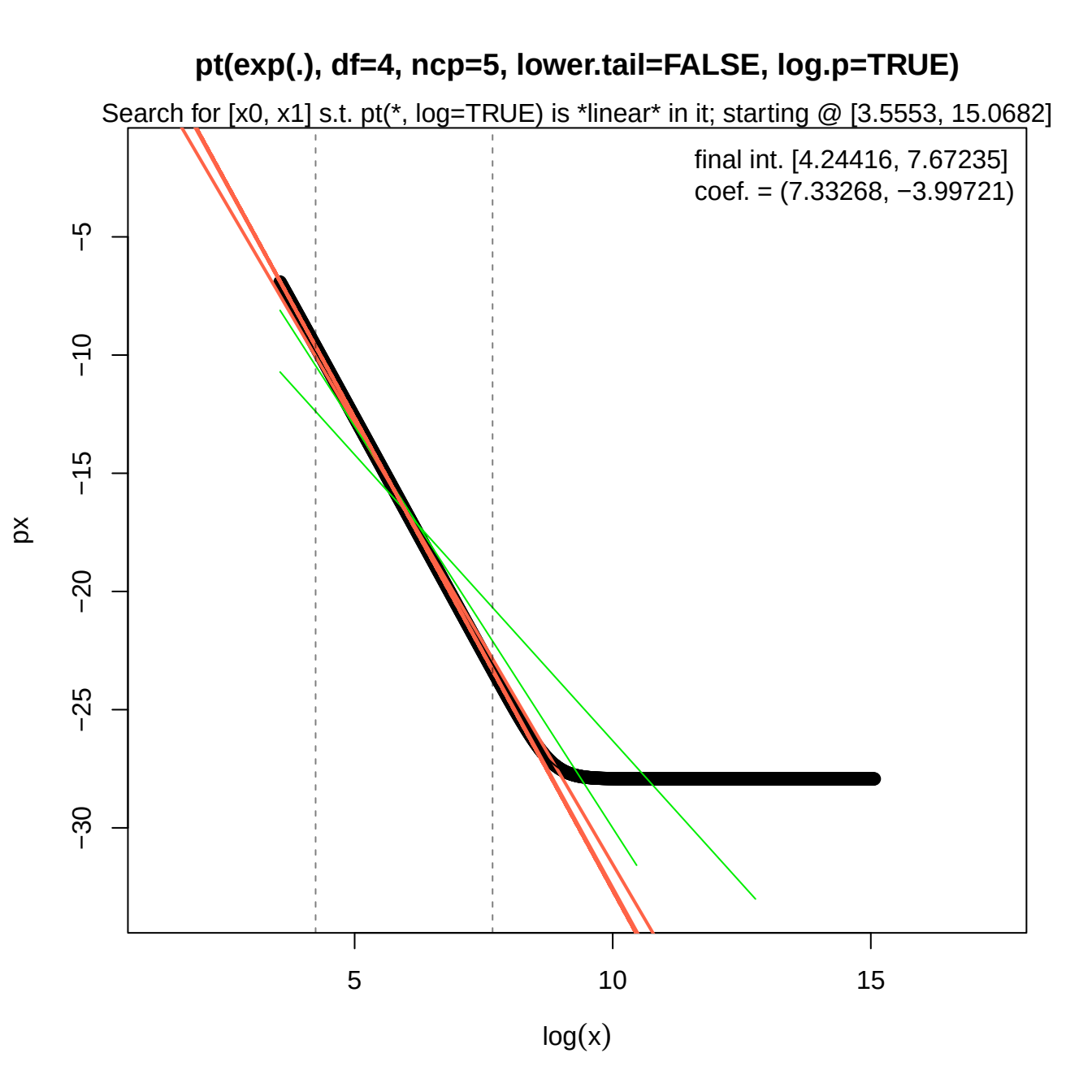

px
−5
−10
−15
−20
−25
−30
1e+00
1e+02
1e+04
1e+06
1e+08
1e+10
1e+12
x

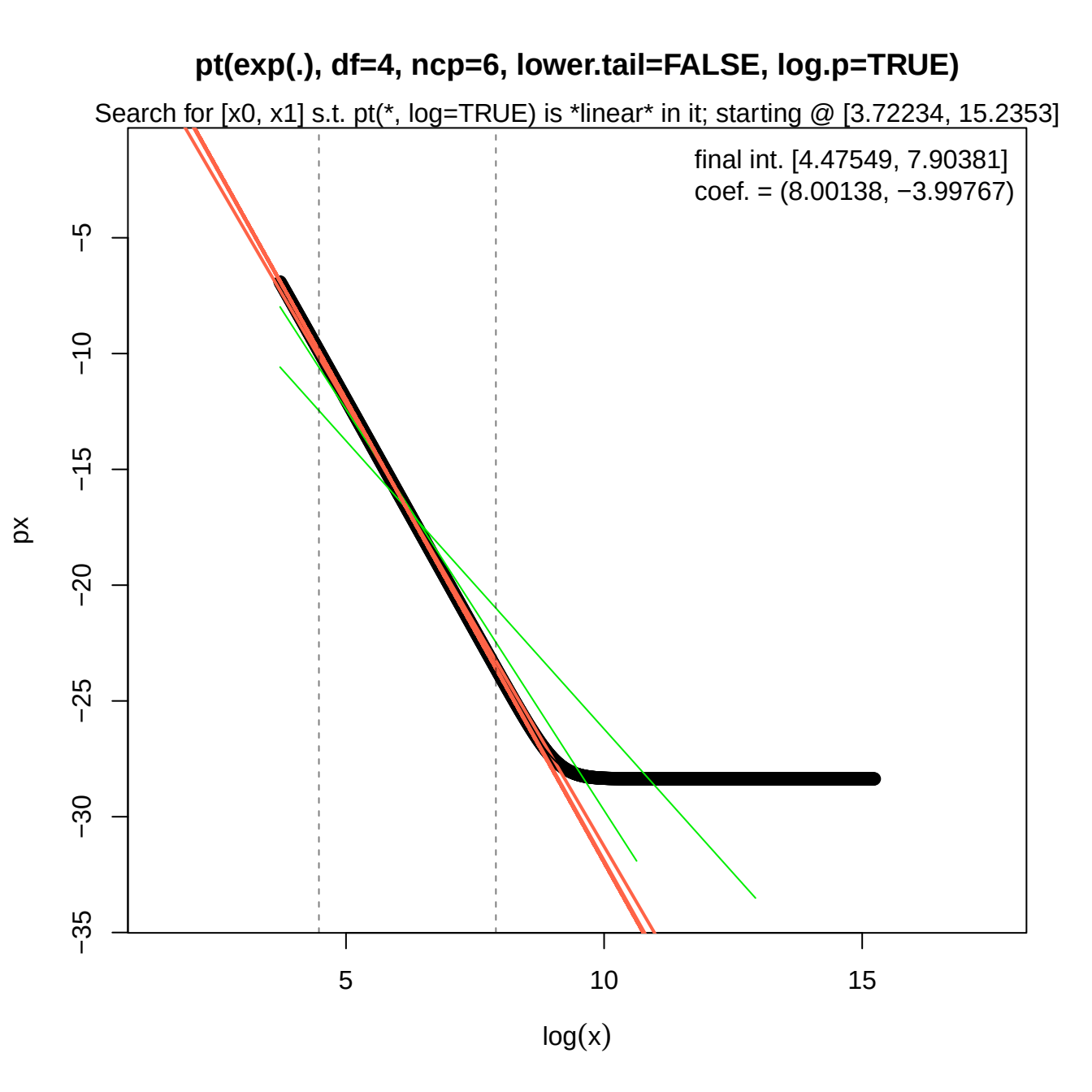

0
−5
−10
−15
−20
−25
−30
px
1e+00
1e+02
1e+04
1e+06
1e+08
1e+10
1e+12
x

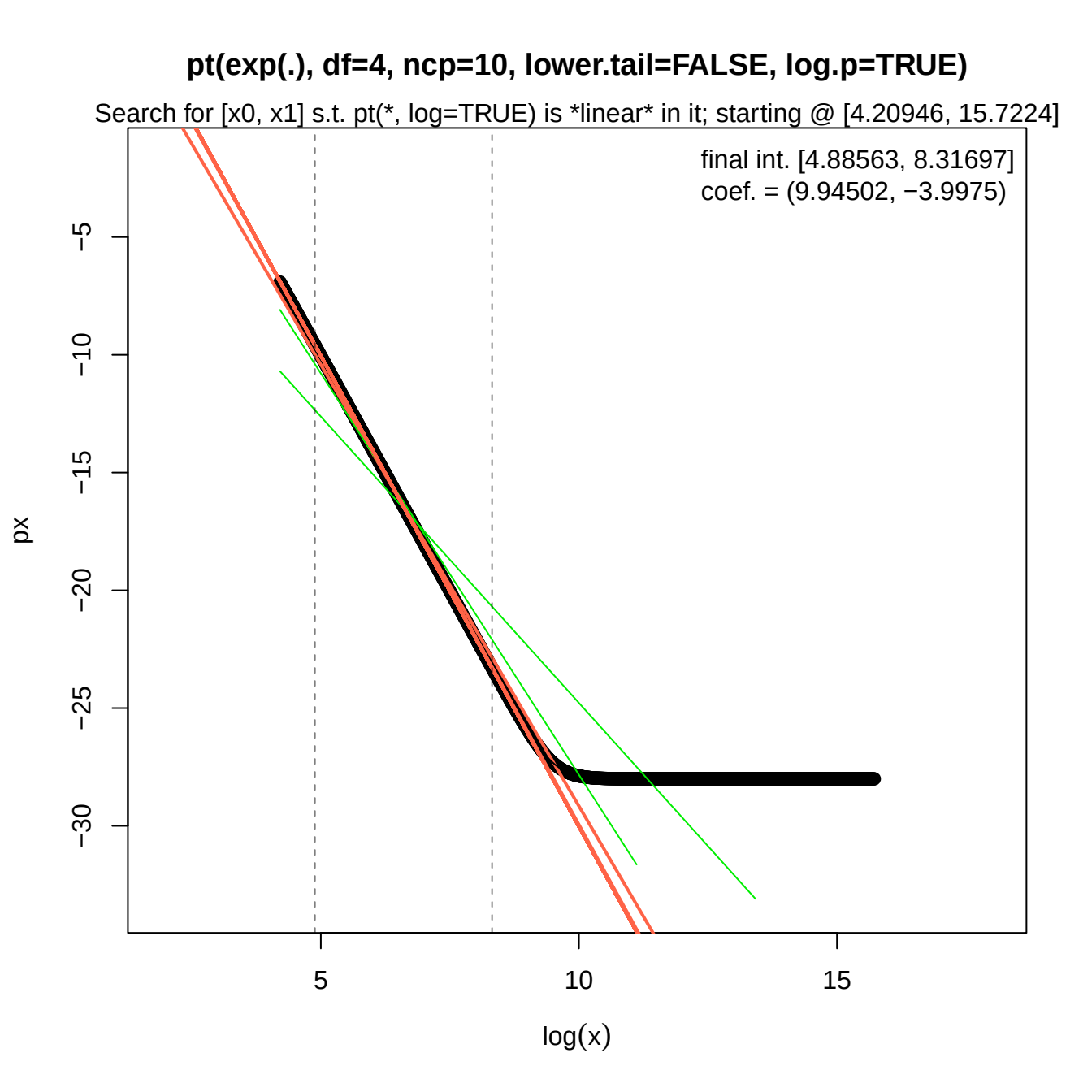

0
−5
−10
−15
−20
−25
px
1e+00
1e+02
1e+04
1e+06
1e+08
1e+10
1e+12
x

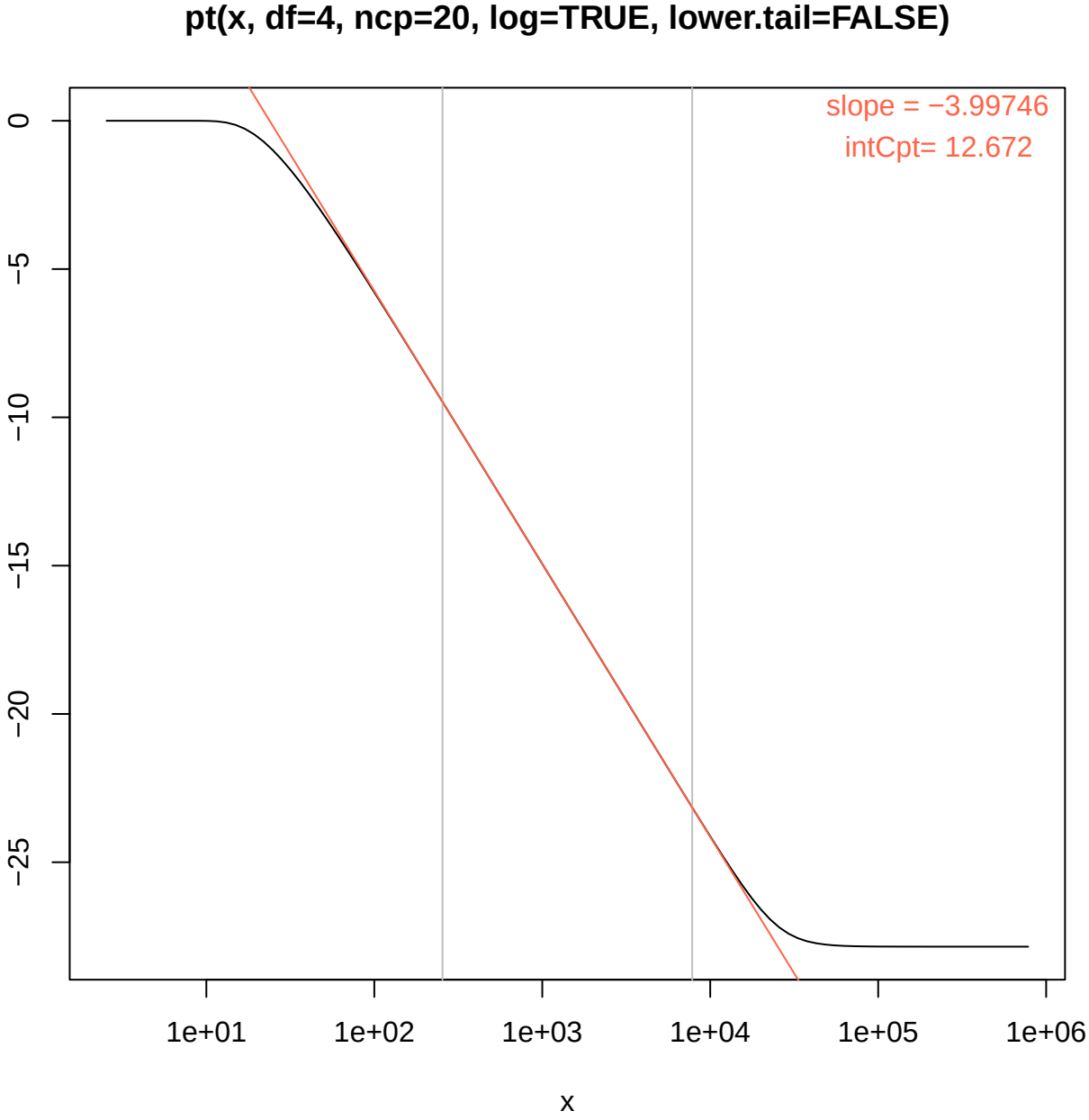

0
−5
−10
−15
−20
−25
px
1e+00
1e+02
1e+04
1e+06
1e+08
1e+10
1e+12
x

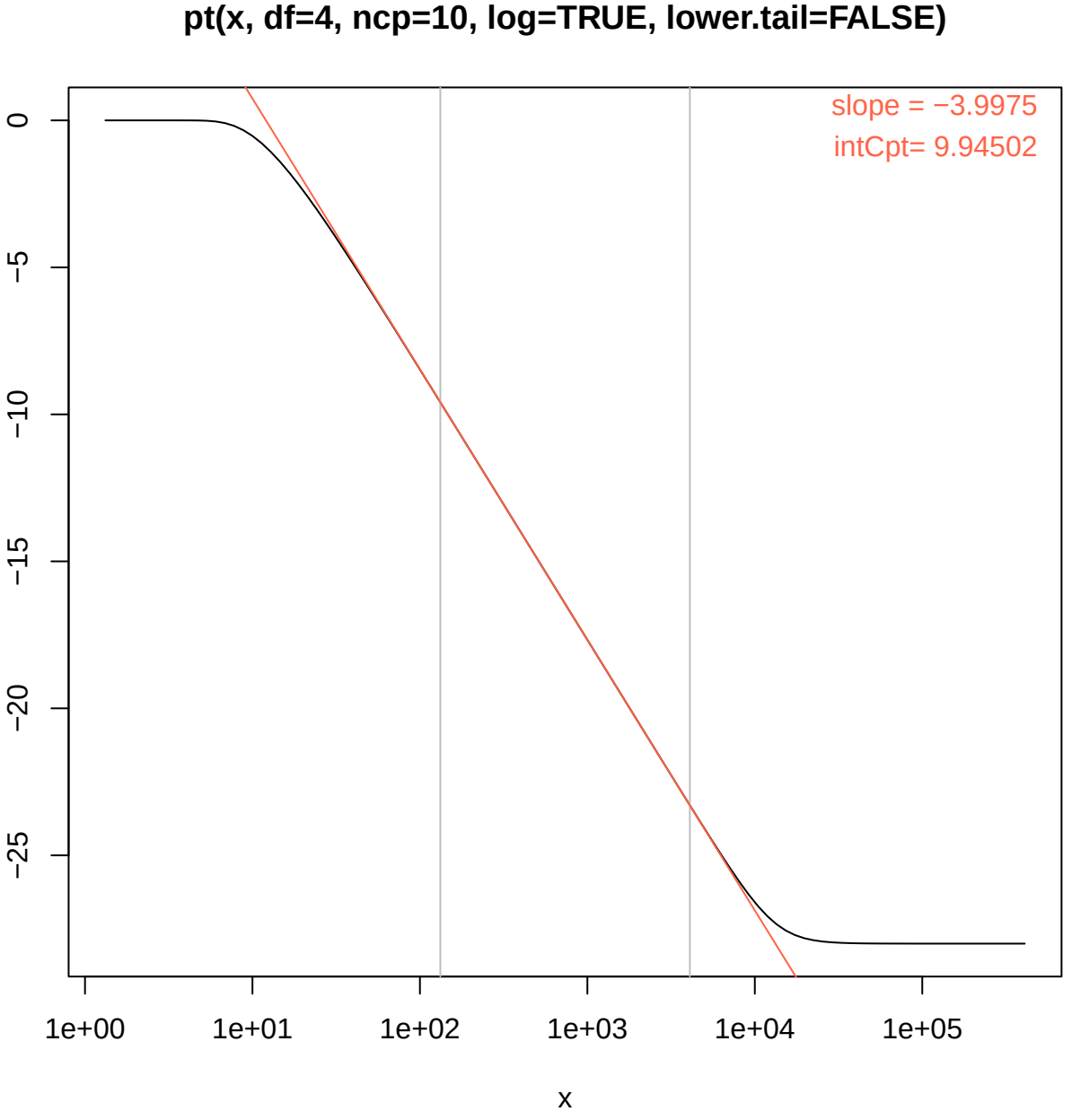

px
0
−5
−10
−15
−20
−25
0
5
10
15
20
25
log(x)

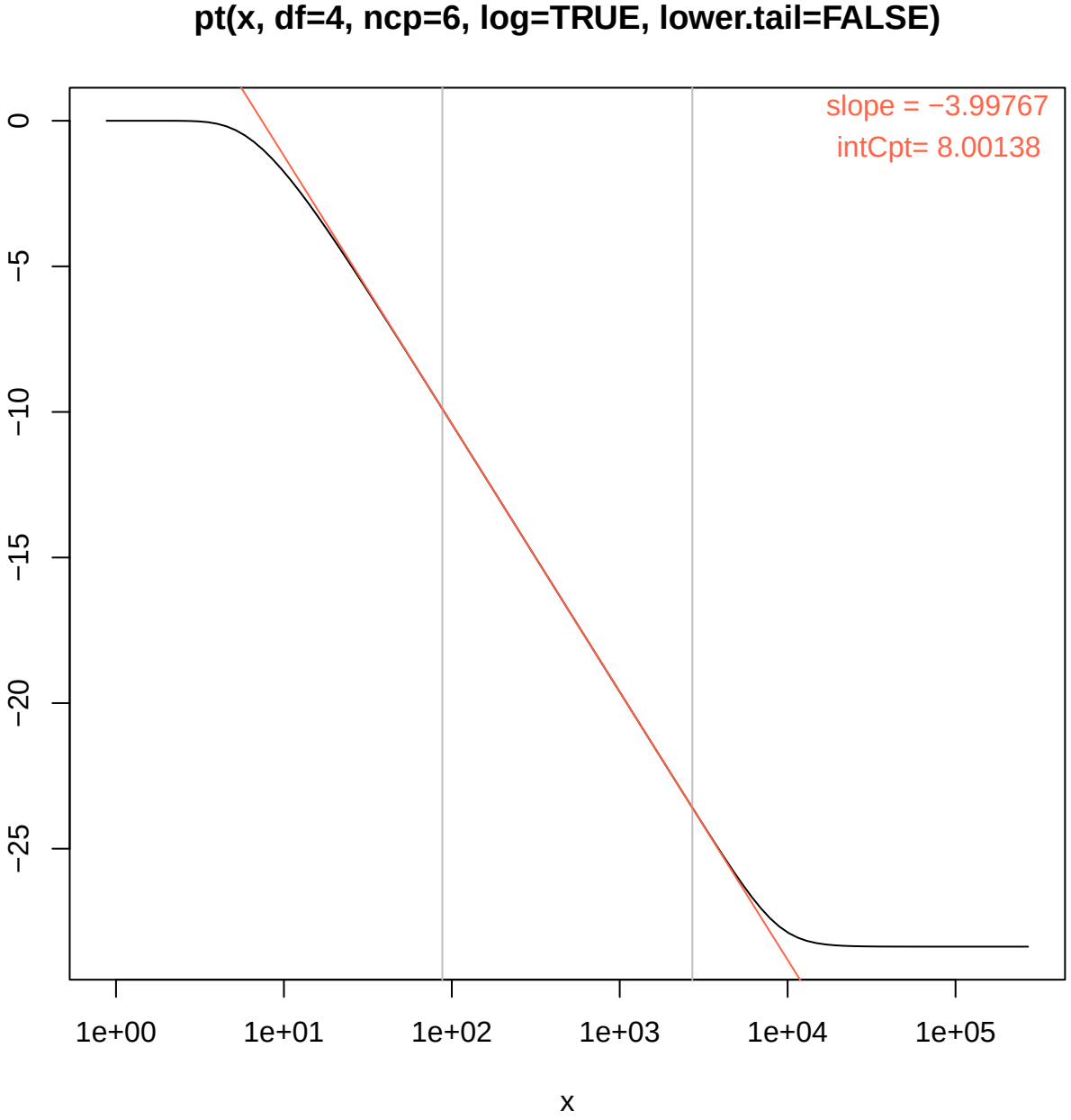

pt(exp(.), df=4, ncp=5, lower.tail=FALSE, log.p=TRUE)
Search for [x0, x1] s.t. pt(*, log=TRUE) is *linear* in it; starting @ [3.5553, 15.0682]
final int. [4.24416, 7.67235]
coef. = (7.33268, −3.99721)
px
−5
−10
−15
−20
−25
−30
5
10
15
log(x)

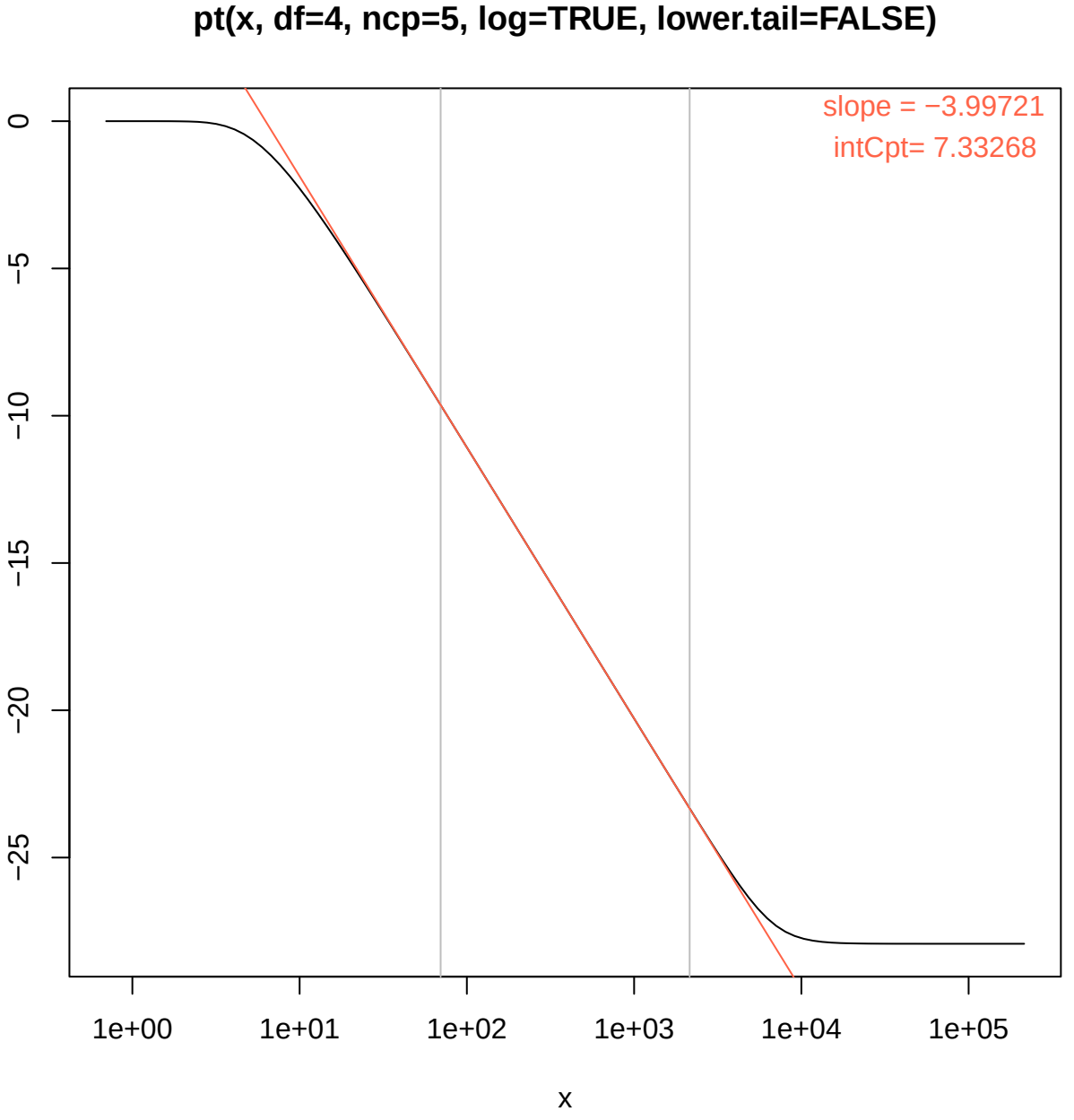

pt(exp(.), df=4, ncp=6, lower.tail=FALSE, log.p=TRUE)
Search for [x0, x1] s.t. pt(*, log=TRUE) is *linear* in it; starting @ [3.72234, 15.2353]
final int. [4.47549, 7.90381]
coef. = (8.00138, −3.99767)
px
−5
−10
−15
−20
−25
−30
−35
5
10
15
log(x)

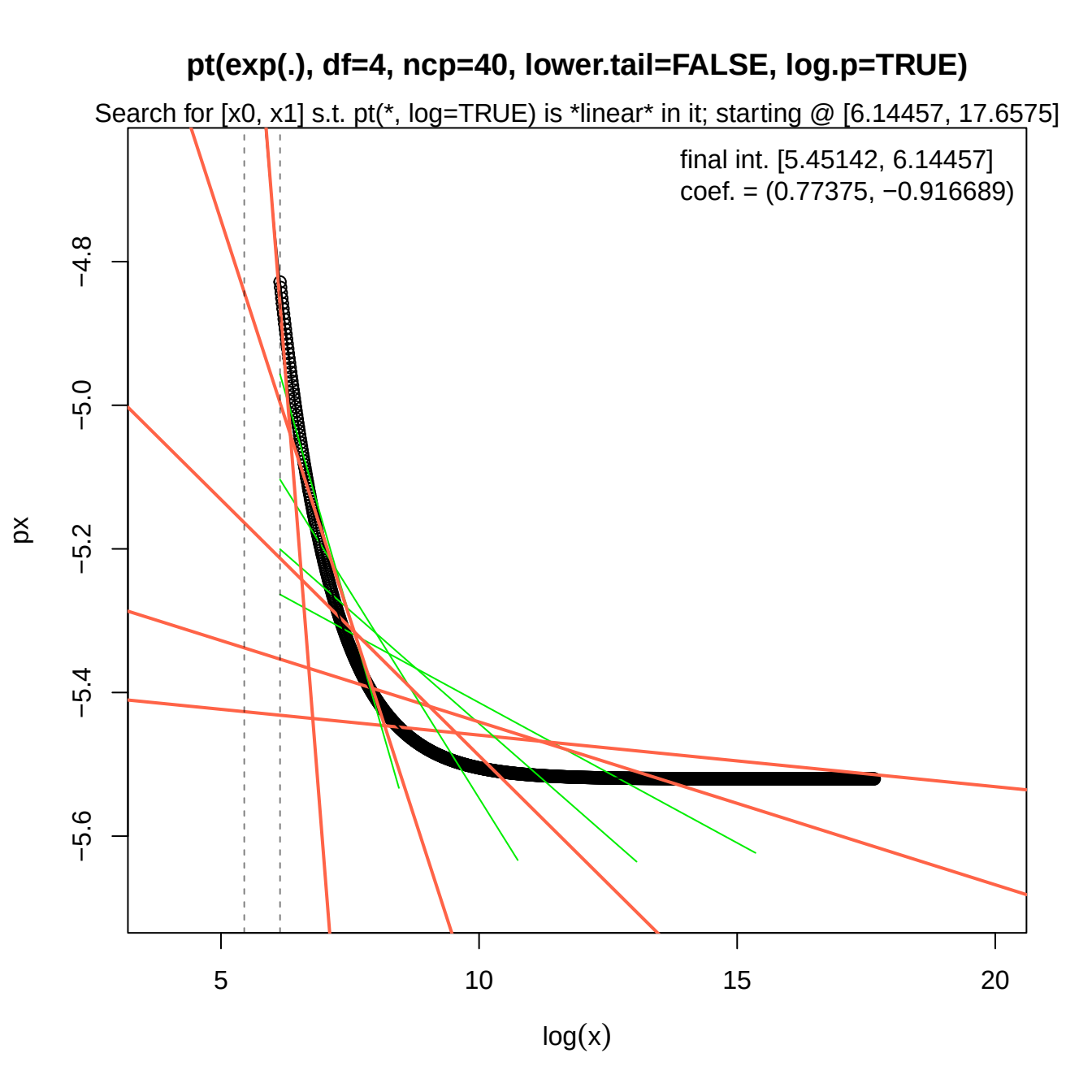

pt(exp(.), df=4, ncp=10, lower.tail=FALSE, log.p=TRUE)
Search for [x0, x1] s.t. pt(*, log=TRUE) is *linear* in it; starting @ [4.20946, 15.7224]
final int. [4.88563, 8.31697]
coef. = (9.94502, −3.9975)
px
−5
−10
−15
−20
−25
−30
5
10
15
log(x)

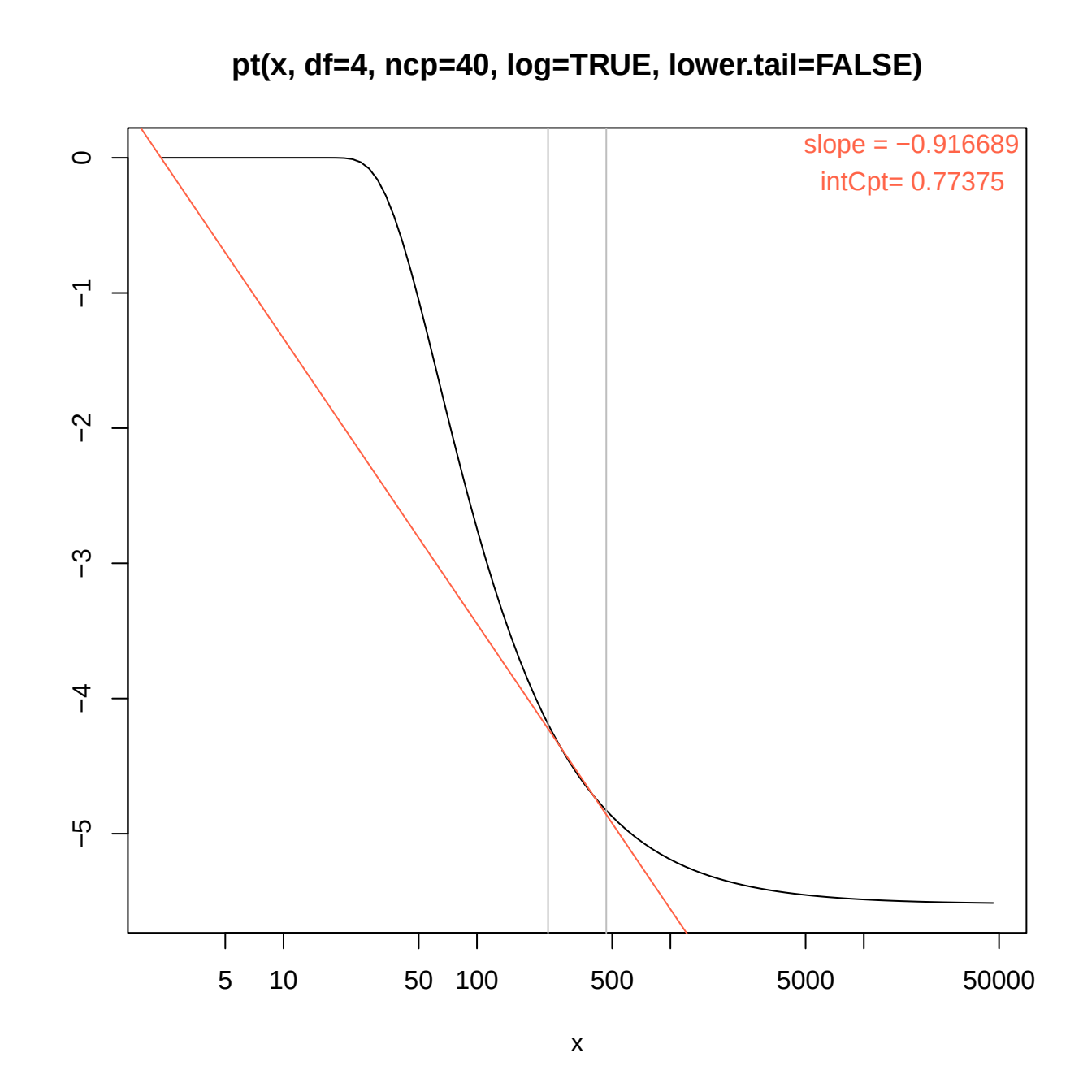

pt(x, df=4, ncp=20, log=TRUE, lower.tail=FALSE)
slope = −3.99746
intCpt= 12.672
0
−5
−10
−15
−20
−25
1e+01
1e+02
1e+03
1e+04
1e+05
1e+06
x

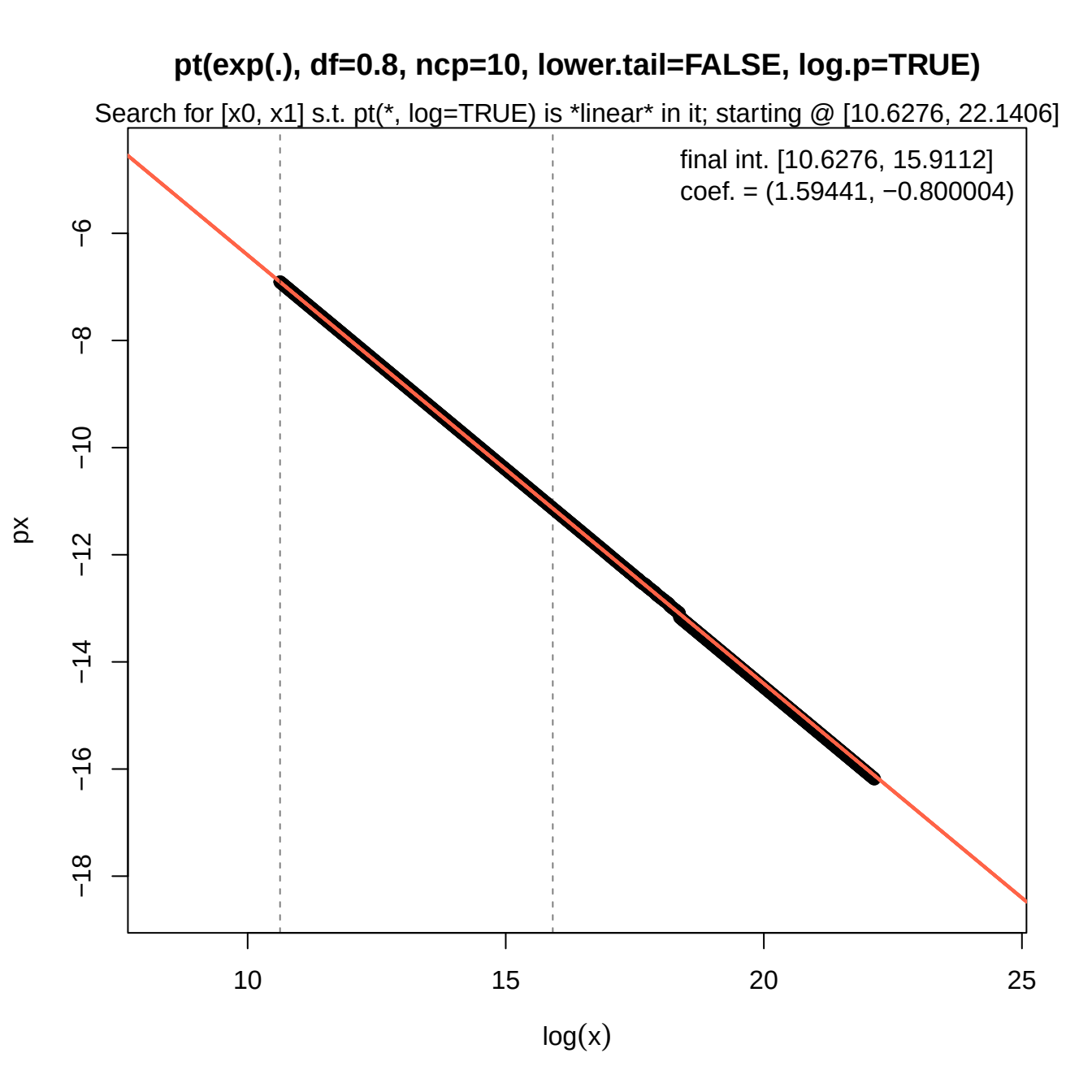

pt(x, df=4, ncp=10, log=TRUE, lower.tail=FALSE)
slope = −3.9975
intCpt= 9.94502
0
−5
−10
−15
−20
−25
1e+00
1e+01
1e+02
1e+03
1e+04
1e+05
x

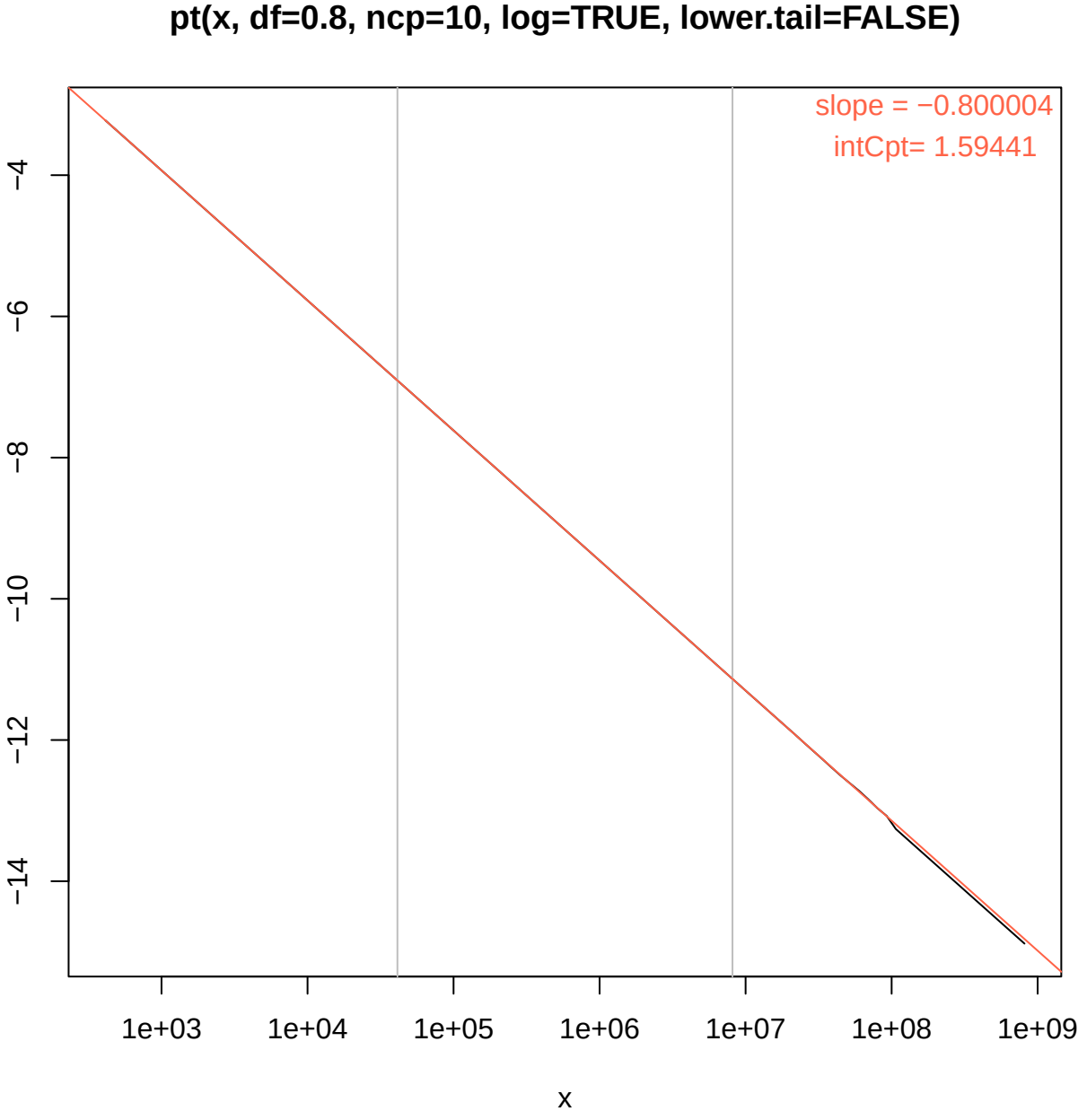

pt(x, df=4, ncp=6, log=TRUE, lower.tail=FALSE)
slope = −3.99767
intCpt= 8.00138
0
−5
−10
−15
−20
−25
1e+00
1e+01
1e+02
1e+03
1e+04
1e+05
x

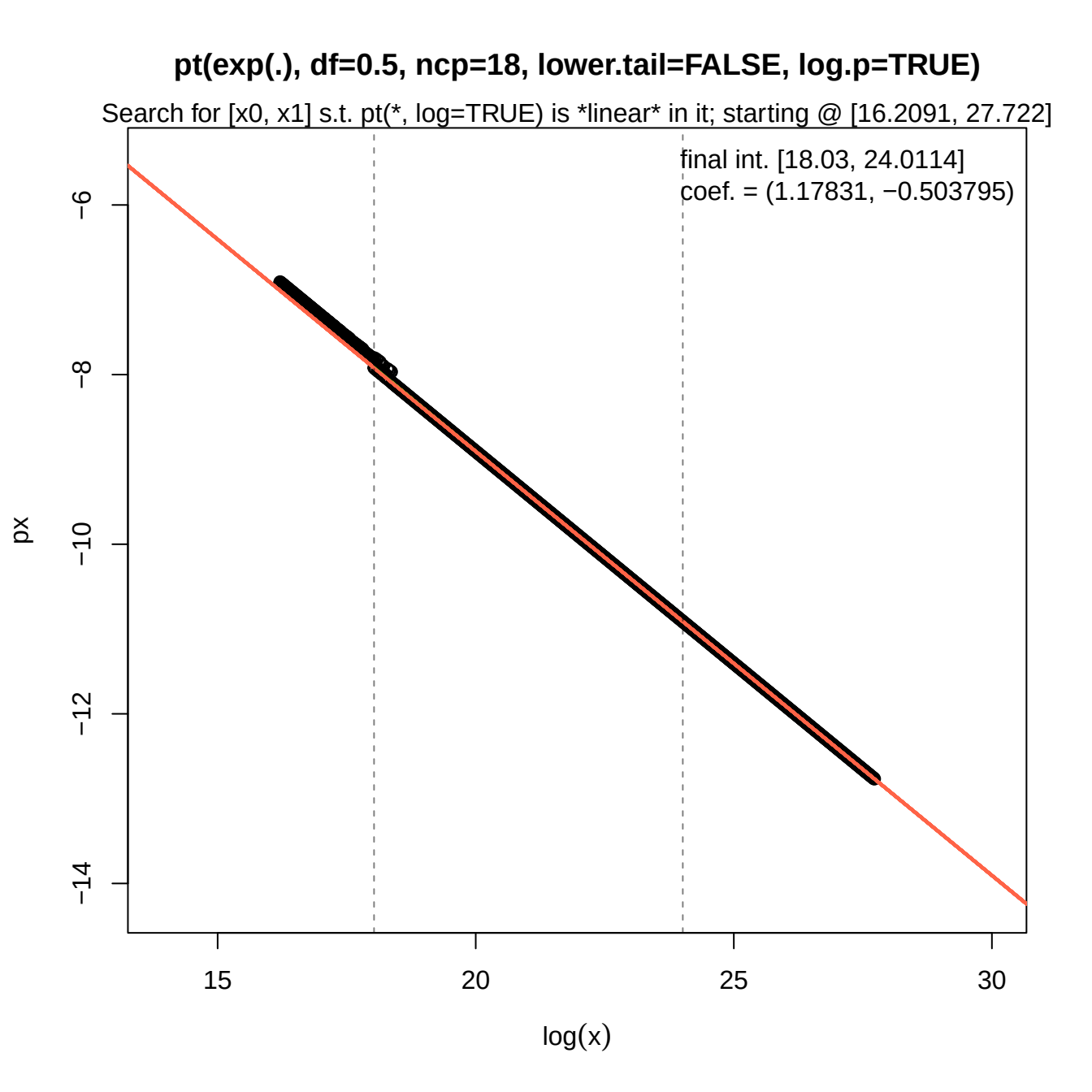

pt(x, df=4, ncp=5, log=TRUE, lower.tail=FALSE)
slope = −3.99721
intCpt= 7.33268
0
−5
−10
−15
−20
−25
1e+00
1e+01
1e+02
1e+03
1e+04
1e+05
x

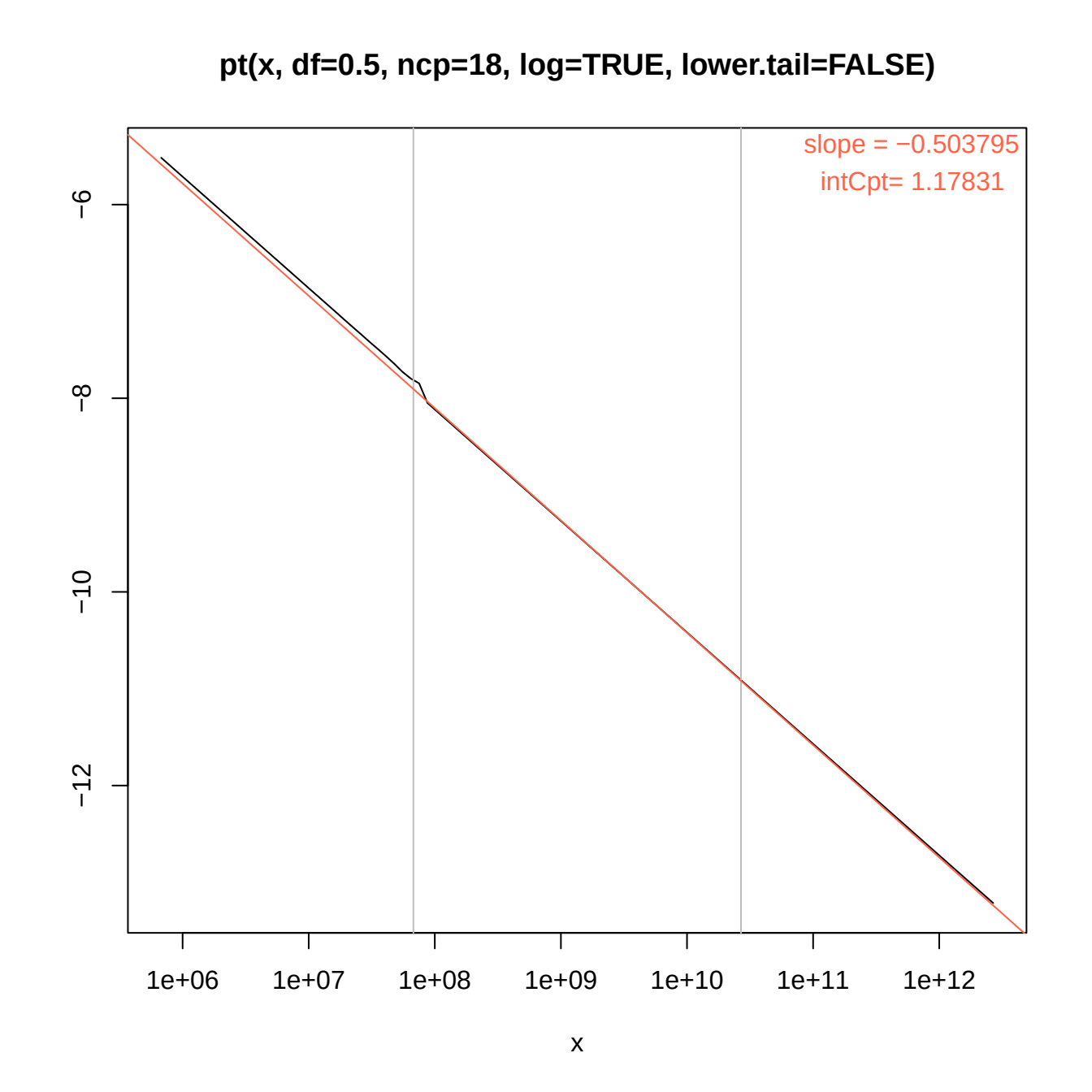

pt(exp(.), df=4, ncp=40, lower.tail=FALSE, log.p=TRUE)
Search for [x0, x1] s.t. pt(*, log=TRUE) is *linear* in it; starting @ [6.14457, 17.6575]
final int. [5.45142, 6.14457]
coef. = (0.77375, −0.916689)
px
−4.8
−5.0
−5.2
−5.4
−5.6
5
10
15
20
log(x)

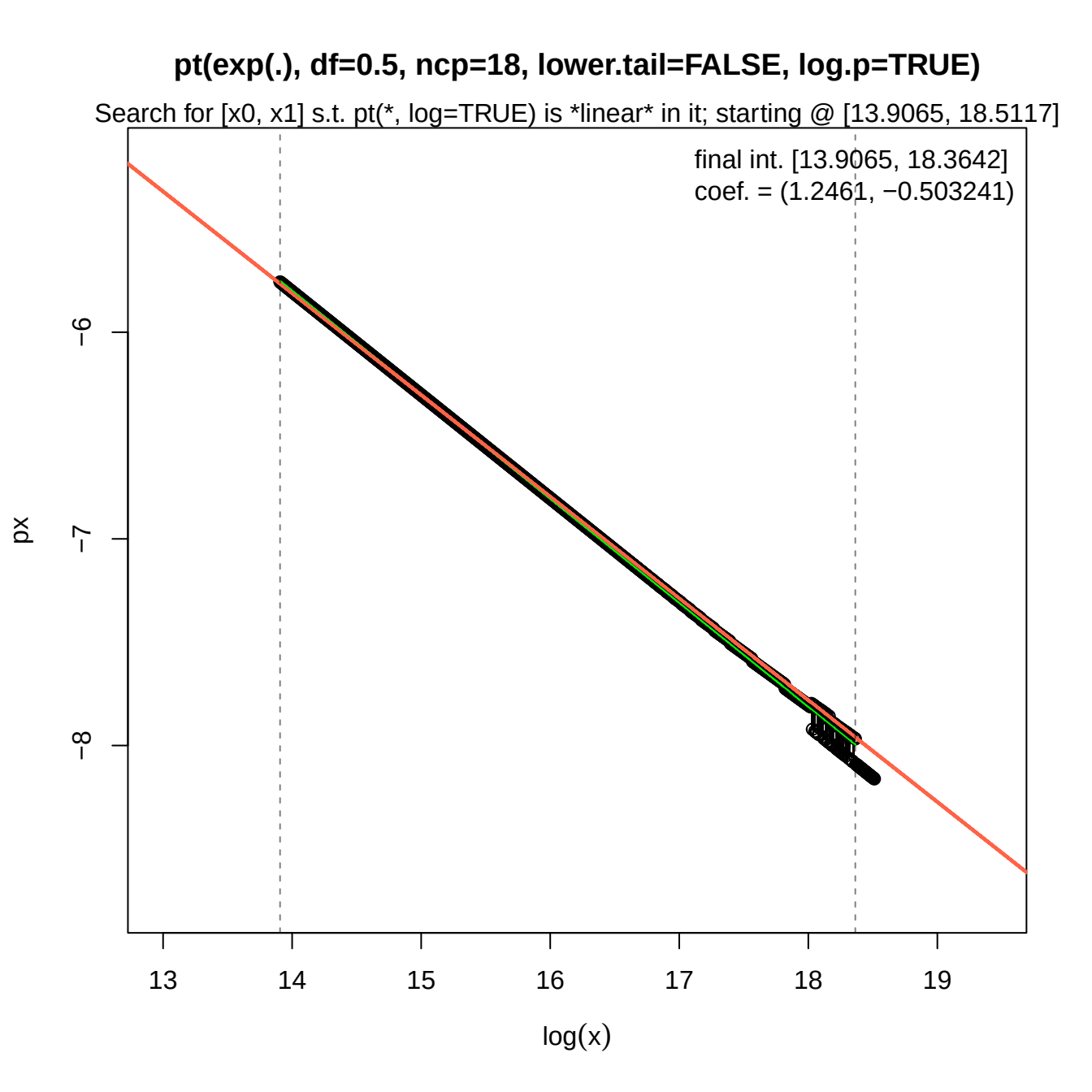

pt(x, df=4, ncp=40, log=TRUE, lower.tail=FALSE)
slope = −0.916689
intCpt= 0.77375
0
−1
−2
−3
−4
−5
5
10
50
100
500
5000
50000
x

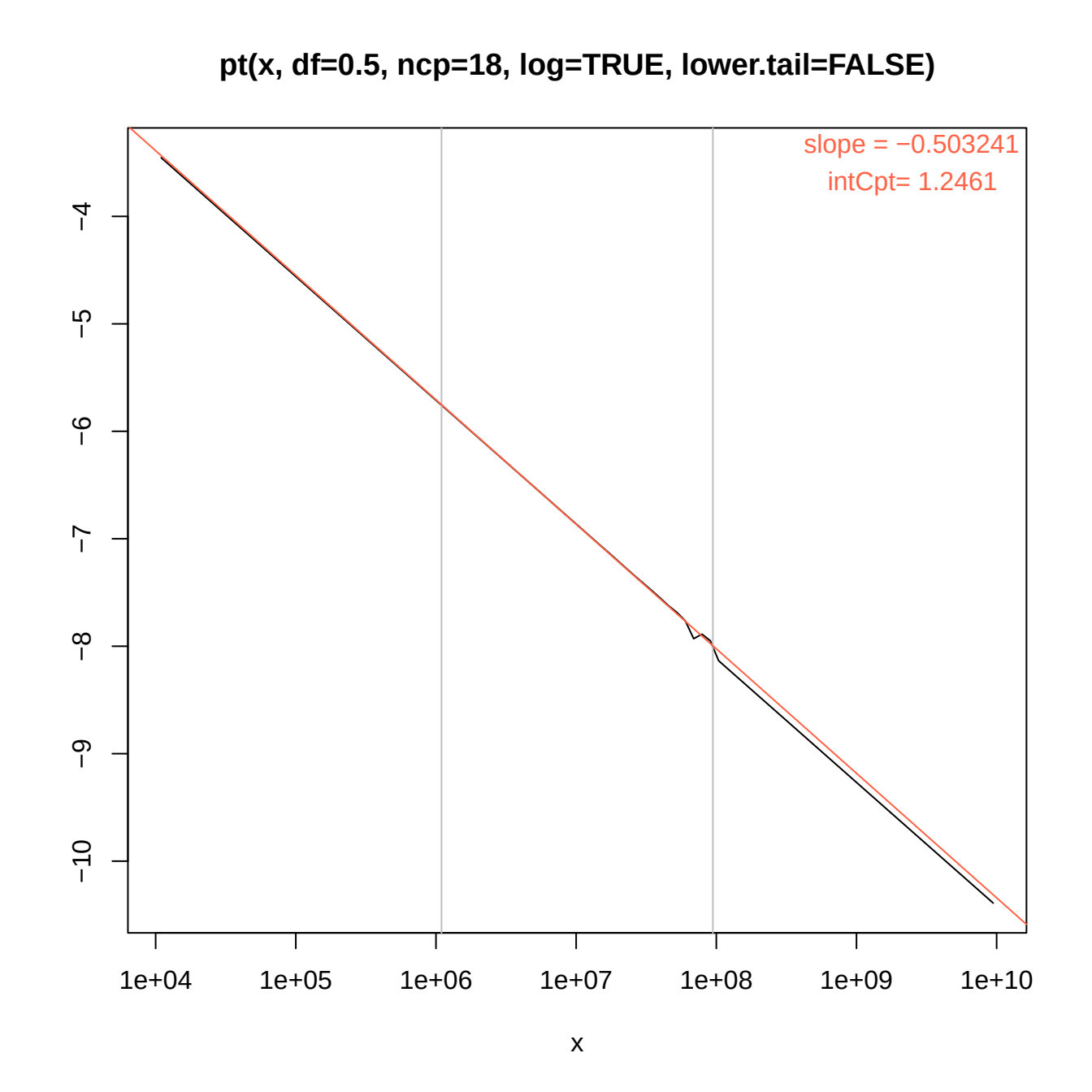

pt(exp(.), df=0.8, ncp=10, lower.tail=FALSE, log.p=TRUE)
Search for [x0, x1] s.t. pt(*, log=TRUE) is *linear* in it; starting @ [10.6276, 22.1406]
final int. [10.6276, 15.9112]
coef. = (1.59441, −0.800004)
px
−6
−8
−10
−12
−14
−16
−18
10
15
20
25
log(x)

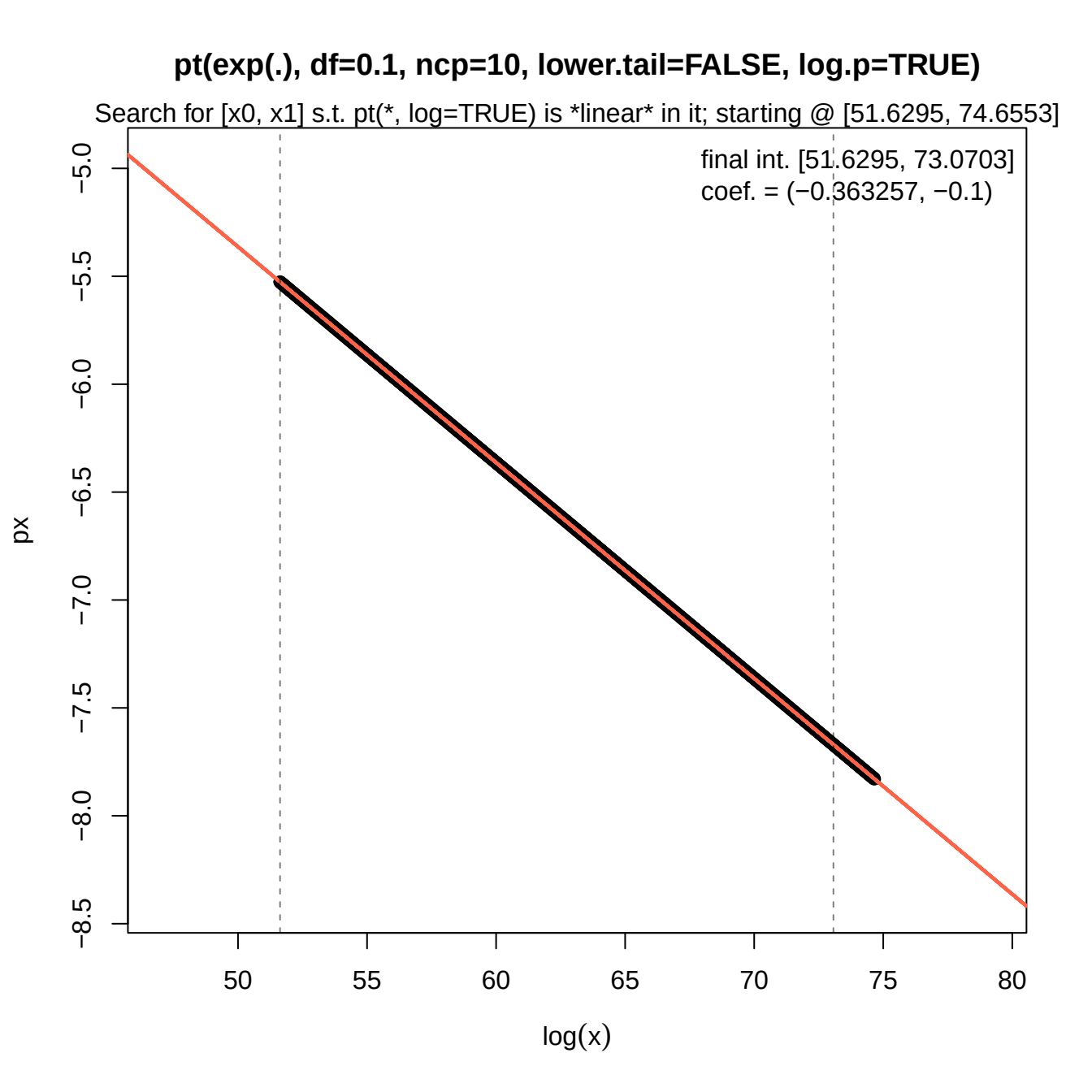

pt(x, df=0.8, ncp=10, log=TRUE, lower.tail=FALSE)
slope = −0.800004
intCpt= 1.59441
−4
−6
−8
−10
−12
−14
1e+03
1e+04
1e+05
1e+06
1e+07
1e+08
1e+09
x

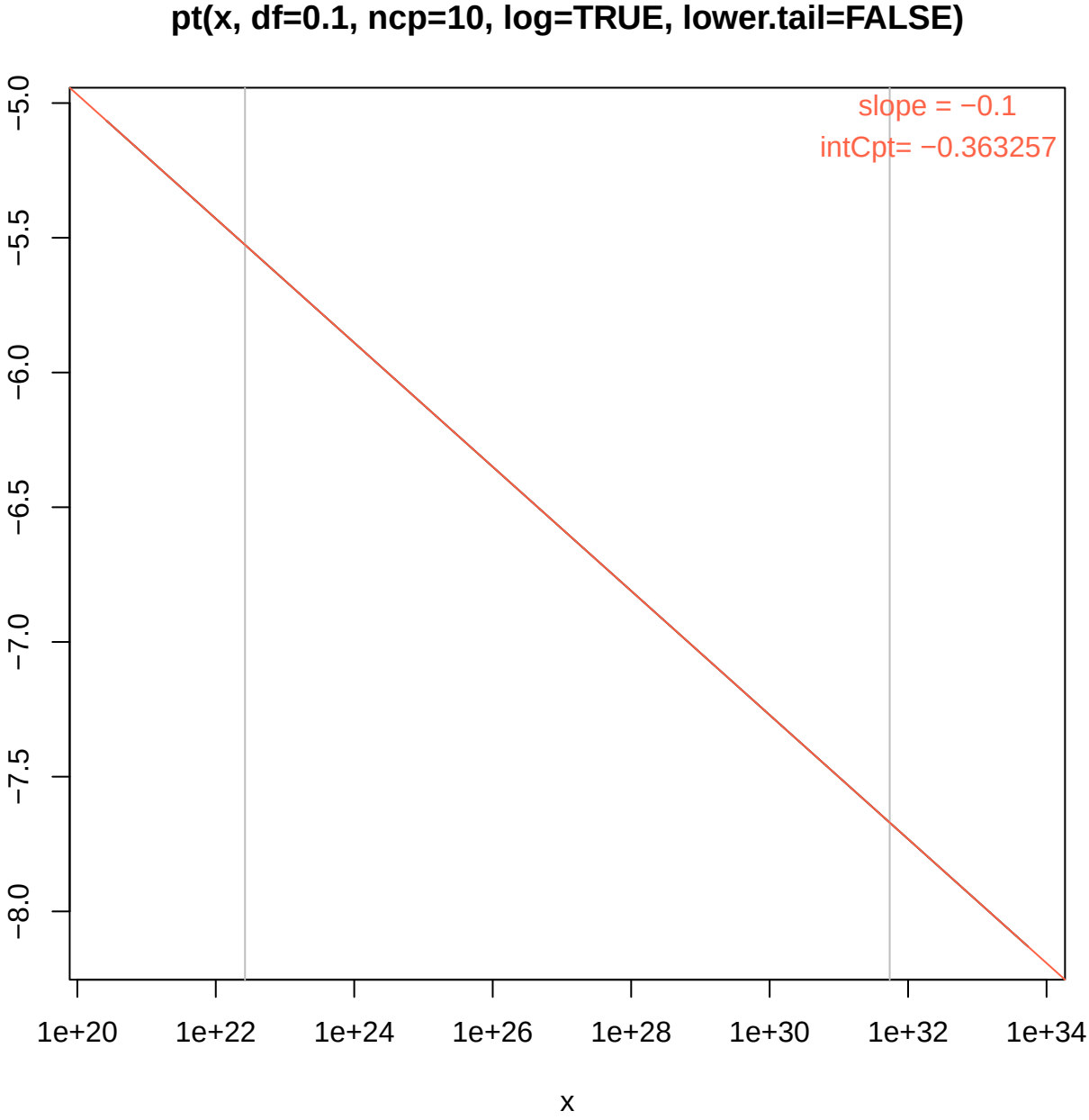

pt(exp(.), df=0.5, ncp=18, lower.tail=FALSE, log.p=TRUE)
Search for [x0, x1] s.t. pt(*, log=TRUE) is *linear* in it; starting @ [16.2091, 27.722]
final int. [18.03, 24.0114]
coef. = (1.17831, −0.503795)
px
−6
−8
−10
−12
−14
15
20
25
30
log(x)

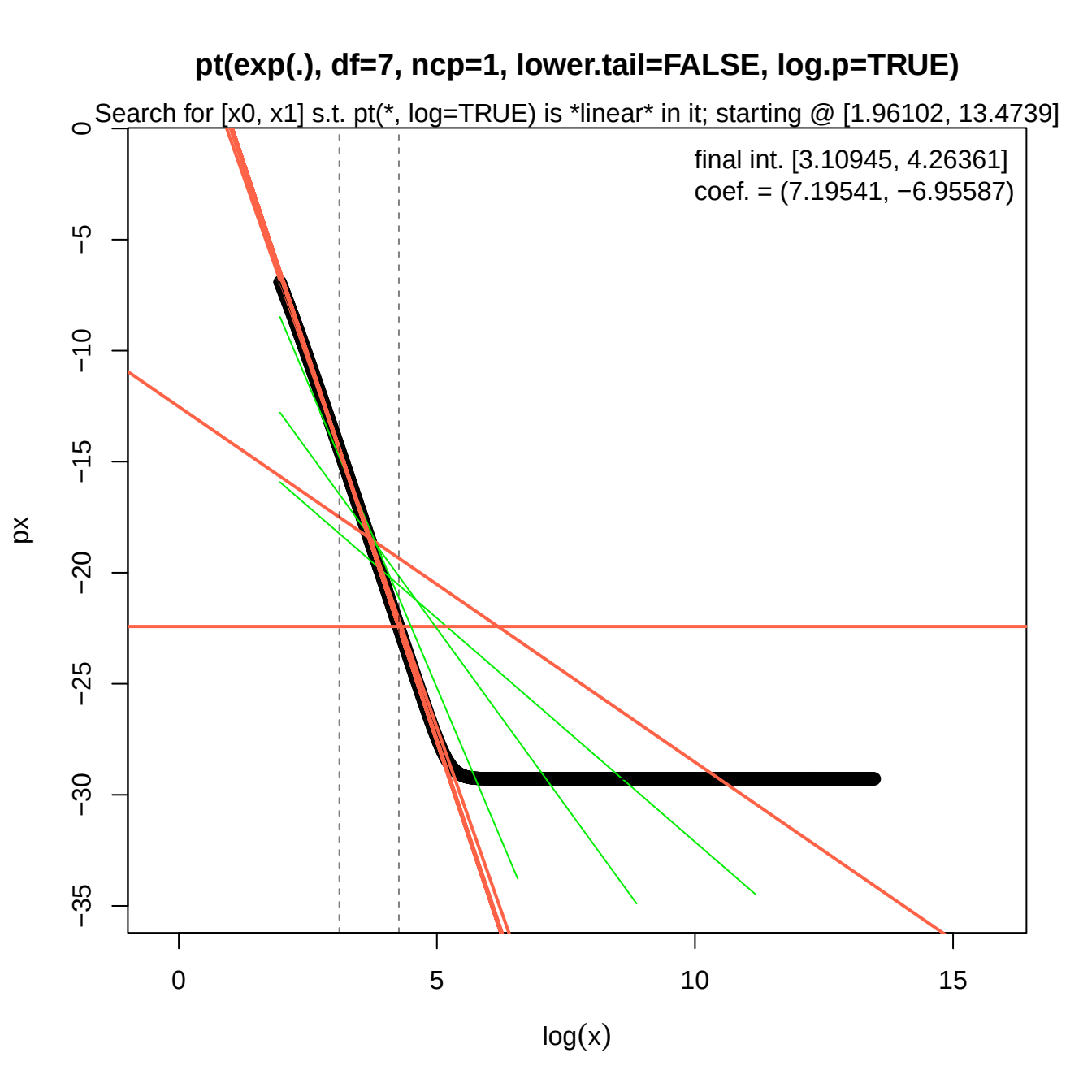

pt(x, df=0.5, ncp=18, log=TRUE, lower.tail=FALSE)
slope = −0.503795
intCpt= 1.17831
−6
−8
−10
−12
1e+06
1e+07
1e+08
1e+09
1e+10
1e+11
1e+12
x

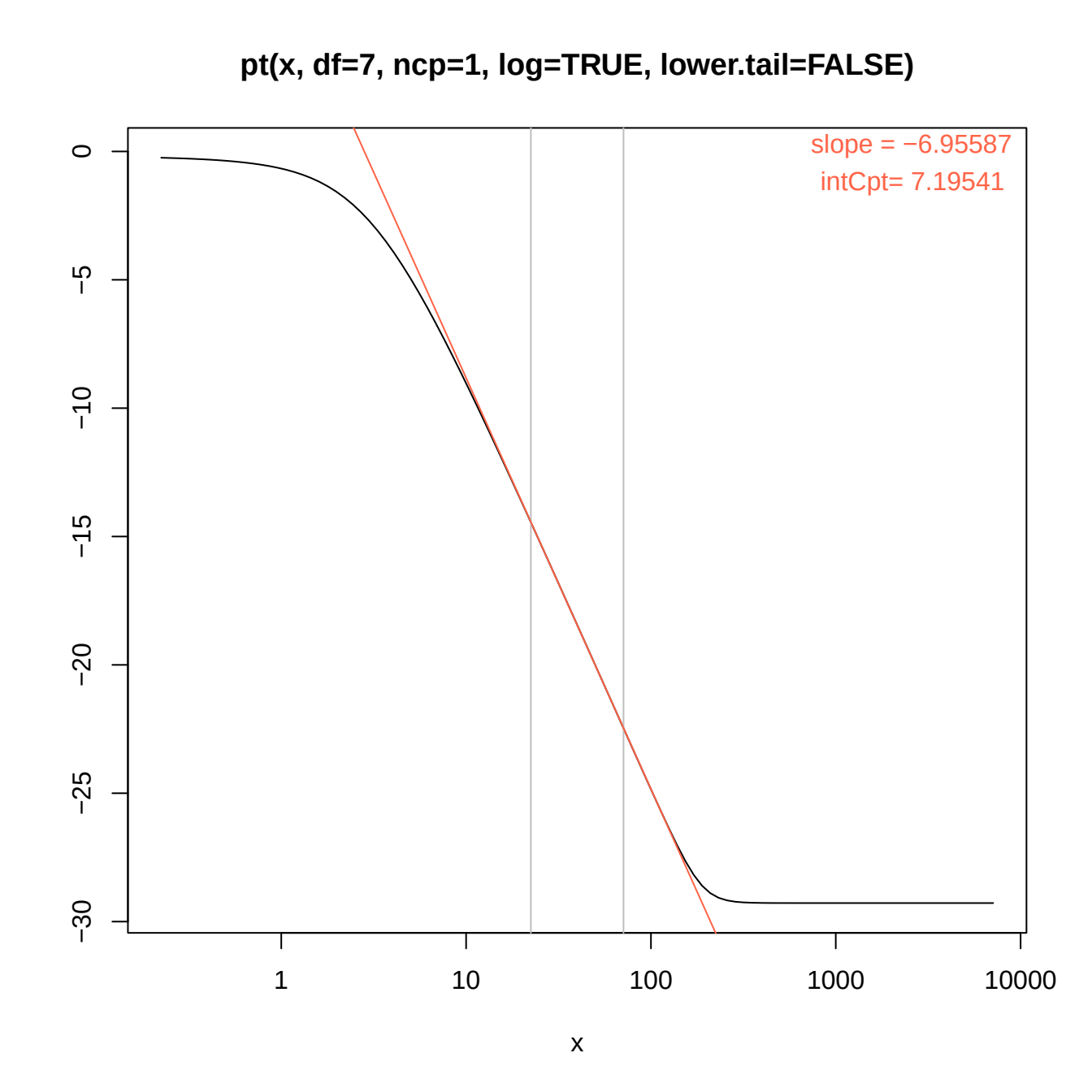

pt(exp(.), df=0.5, ncp=18, lower.tail=FALSE, log.p=TRUE)
Search for [x0, x1] s.t. pt(*, log=TRUE) is *linear* in it; starting @ [13.9065, 18.5117]
final int. [13.9065, 18.3642]
coef. = (1.2461, −0.503241)
px
−6
−7
−8
13
14
15
16
17
18
19
log(x)

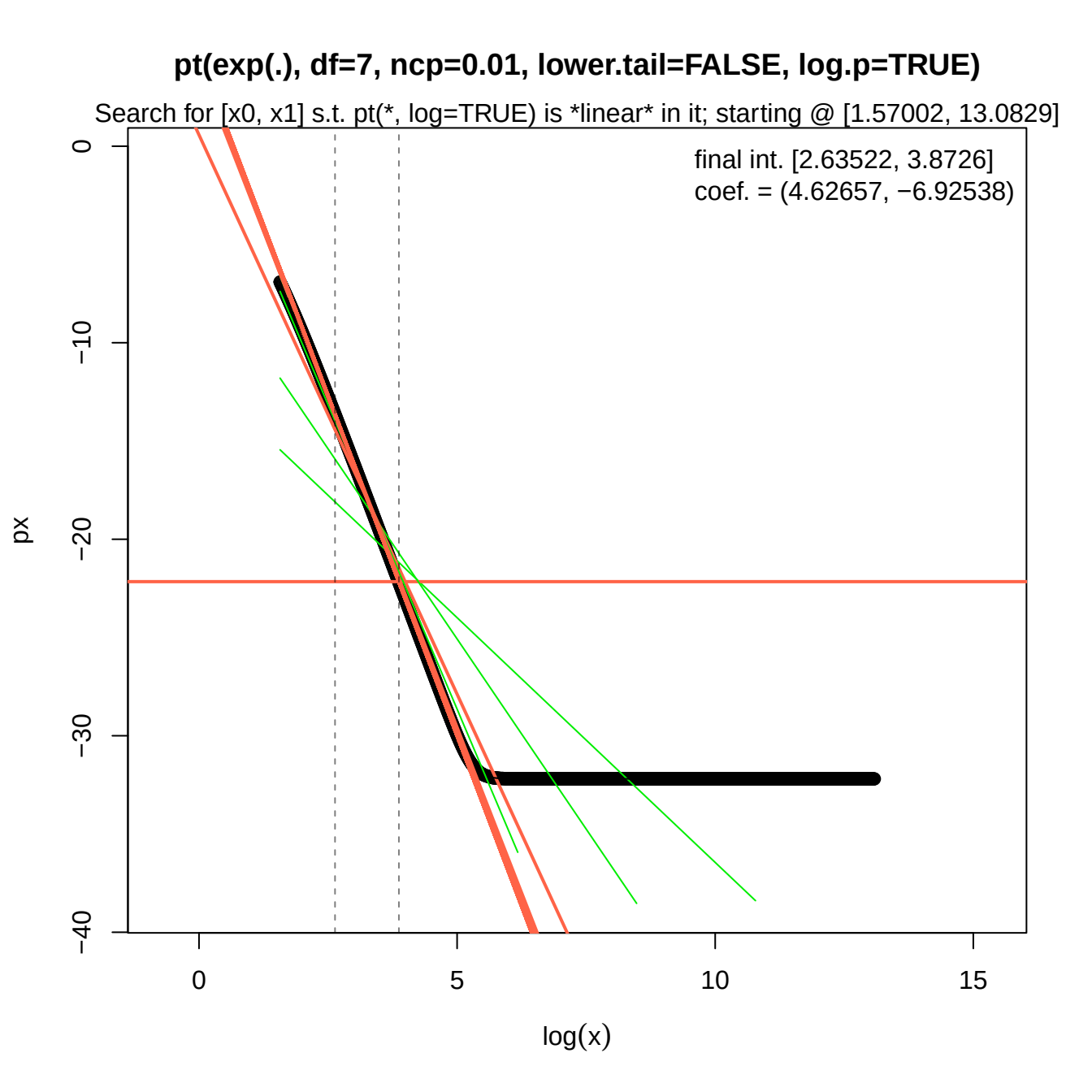

pt(x, df=0.5, ncp=18, log=TRUE, lower.tail=FALSE)
slope = −0.503241
intCpt= 1.2461
−4
−5
−6
−7
−8
−9
−10
1e+04
1e+05
1e+06
1e+07
1e+08
1e+09
1e+10
x

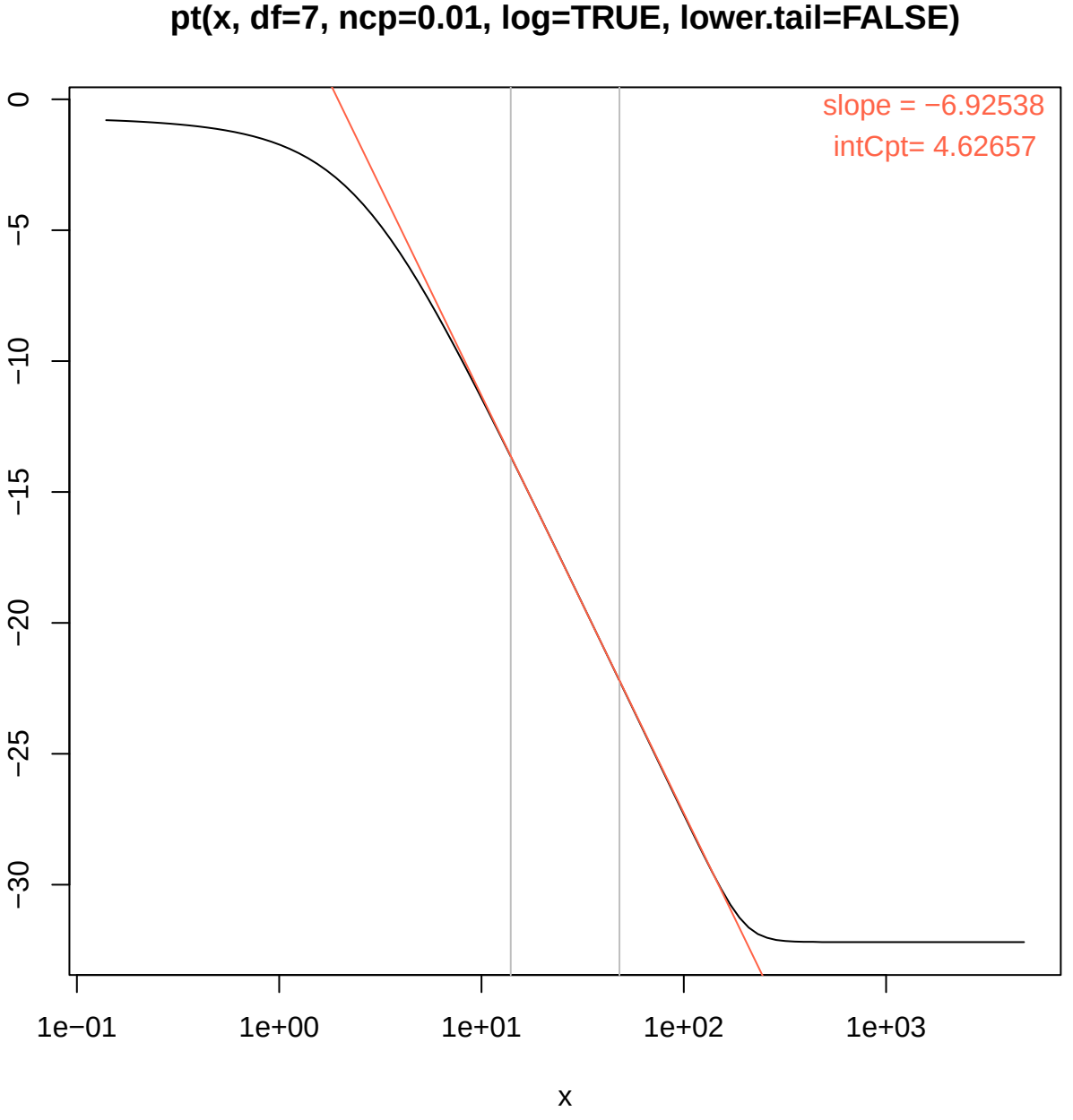

pt(exp(.), df=0.1, ncp=10, lower.tail=FALSE, log.p=TRUE)
Search for [x0, x1] s.t. pt(*, log=TRUE) is *linear* in it; starting @ [51.6295, 74.6553]
final int. [51.6295, 73.0703]
coef. = (−0.363257, −0.1)
px
−5.0
−5.5
−6.0
−6.5
−7.0
−7.5
−8.0
−8.5
50
55
60
65
70
75
80
log(x)

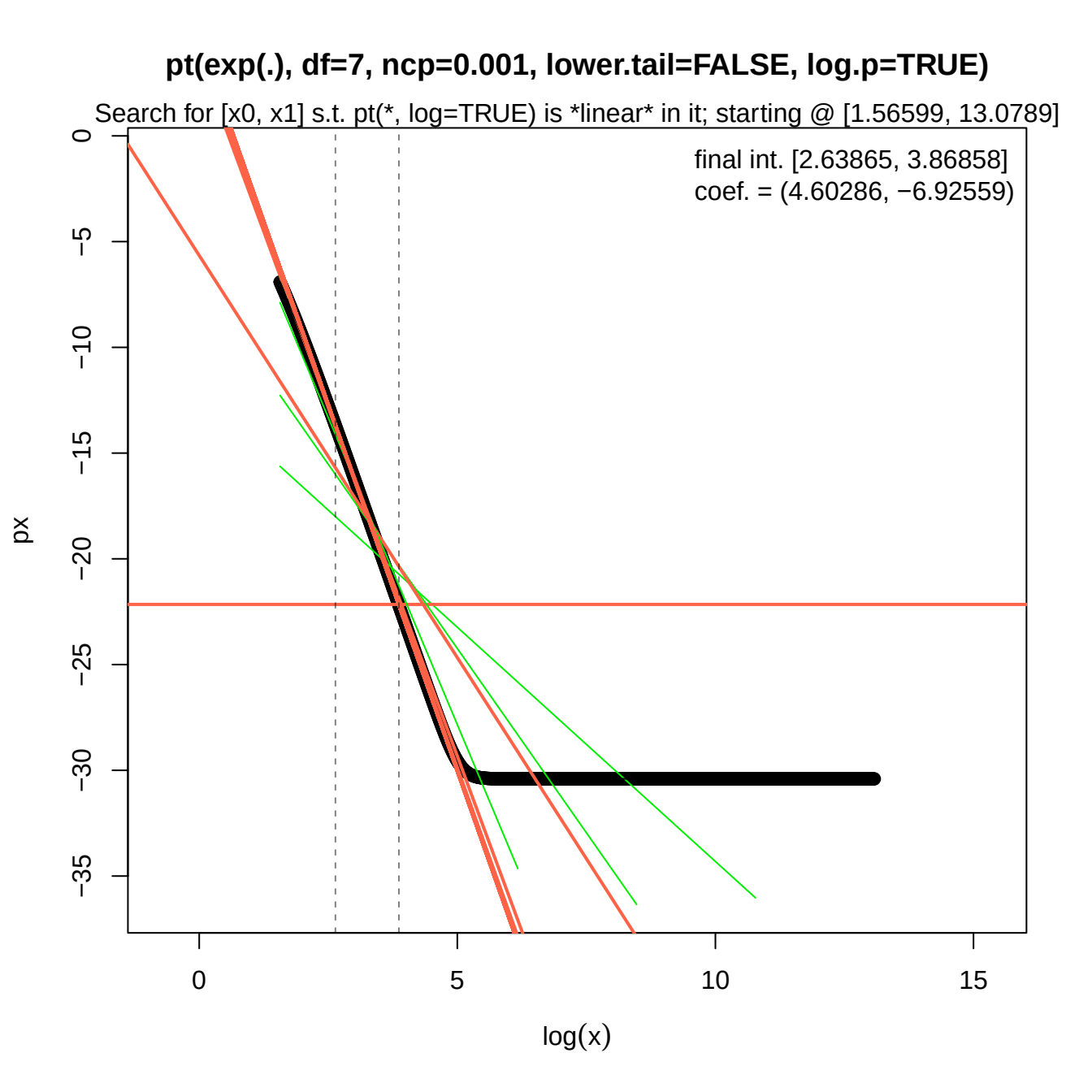

pt(x, df=0.1, ncp=10, log=TRUE, lower.tail=FALSE)
slope = −0.1
intCpt= −0.363257
−5.0
−5.5
−6.0
−6.5
−7.0
−7.5
−8.0
1e+20
1e+22
1e+24
1e+26
1e+28
1e+30
1e+32
1e+34
x

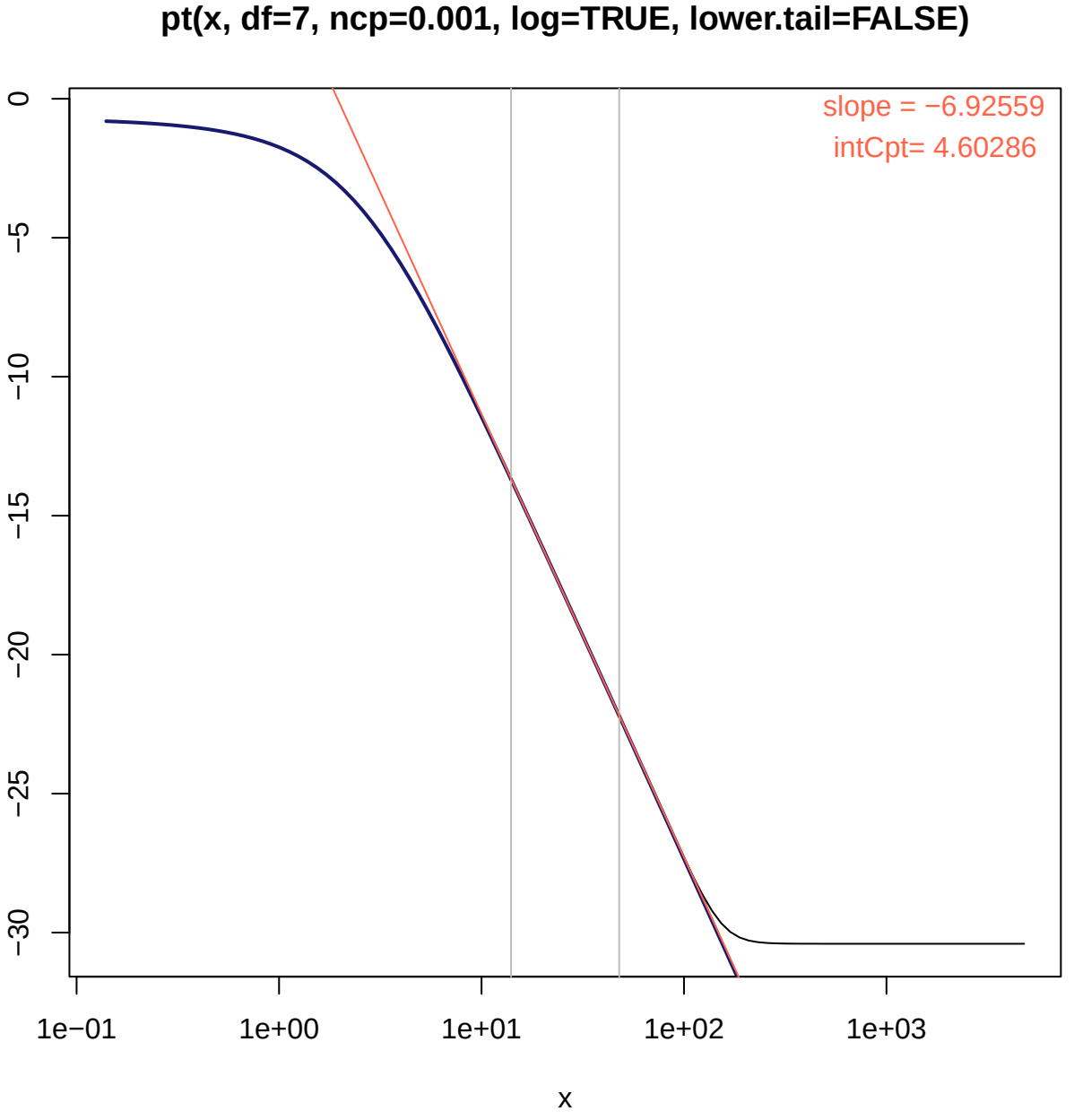

pt(exp(.), df=7, ncp=1, lower.tail=FALSE, log.p=TRUE)
Search for [x0, x1] s.t. pt(*, log=TRUE) is *linear* in it; starting @ [1.96102, 13.4739]
final int. [3.10945, 4.26361]
coef. = (7.19541, −6.95587)
px
0
−5
−10
−15
−20
−25
−30
−35
0
5
10
15
log(x)

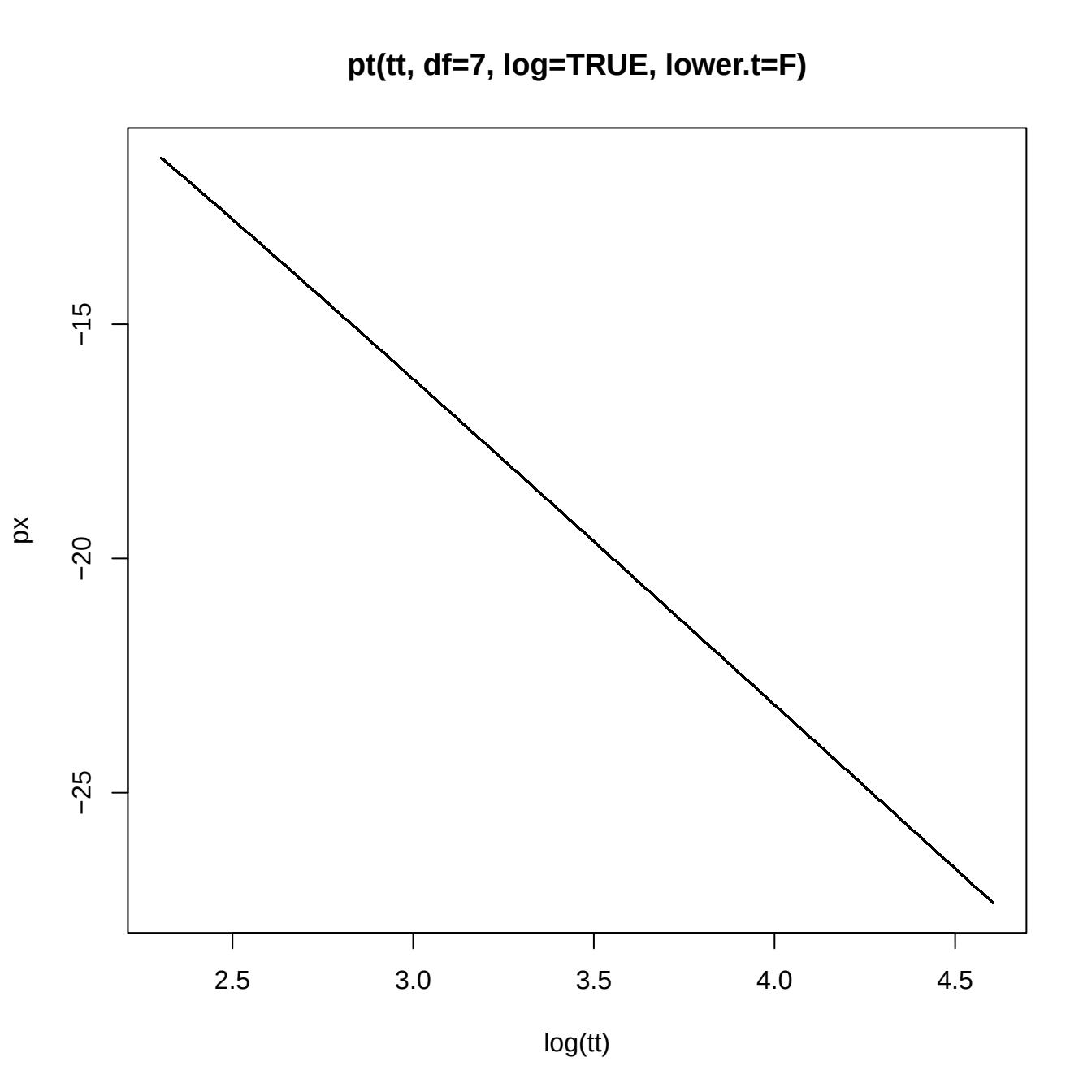

pt(x, df=7, ncp=1, log=TRUE, lower.tail=FALSE)
slope = −6.95587
intCpt= 7.19541
0
−5
−10
−15
−20
−25
−30
1
10
100
1000
10000
x

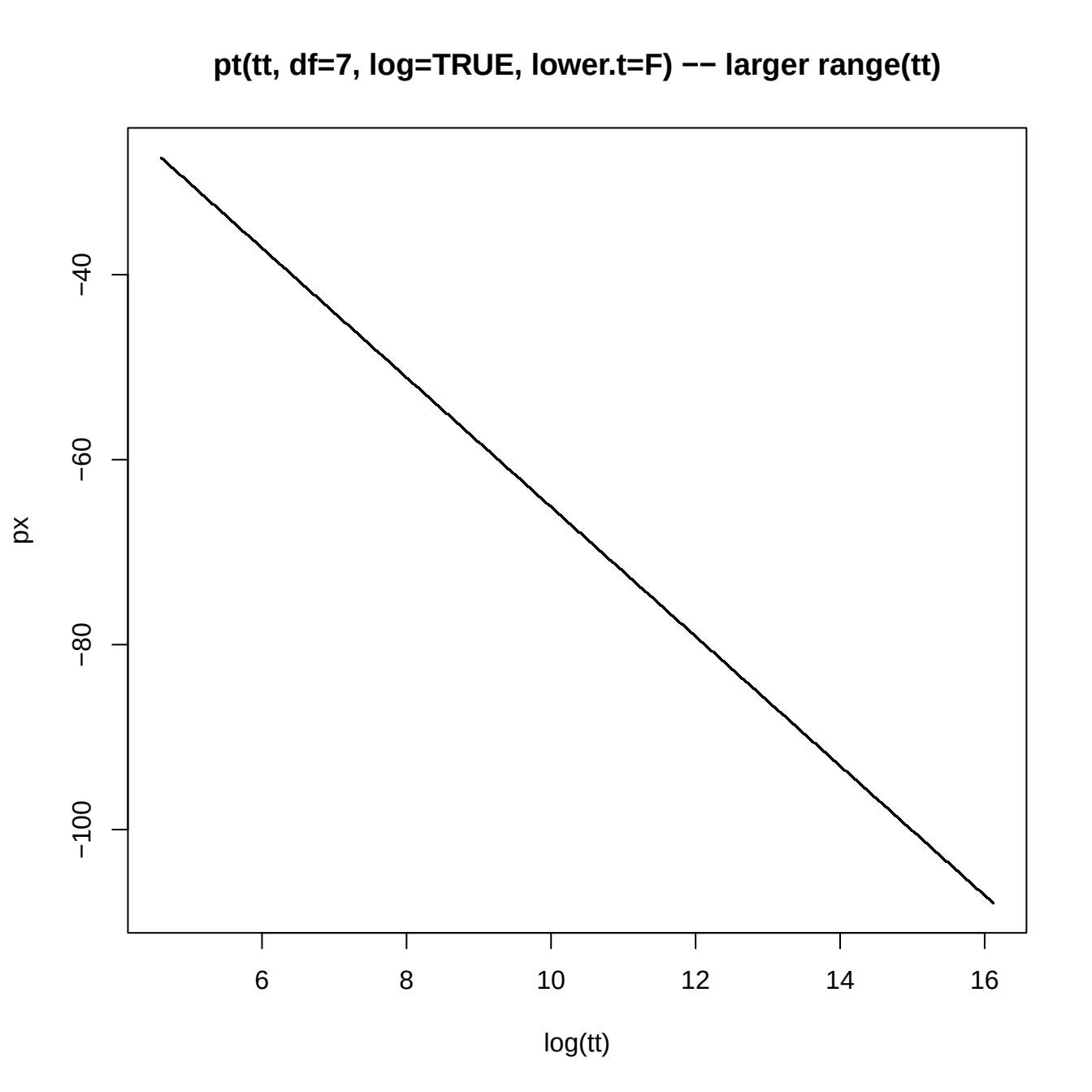

pt(exp(.), df=7, ncp=0.01, lower.tail=FALSE, log.p=TRUE)
Search for [x0, x1] s.t. pt(*, log=TRUE) is *linear* in it; starting @ [1.57002, 13.0829]
final int. [2.63522, 3.8726]
coef. = (4.62657, −6.92538)
px
0
−10
−20
−30
−40
0
5
10
15
log(x)

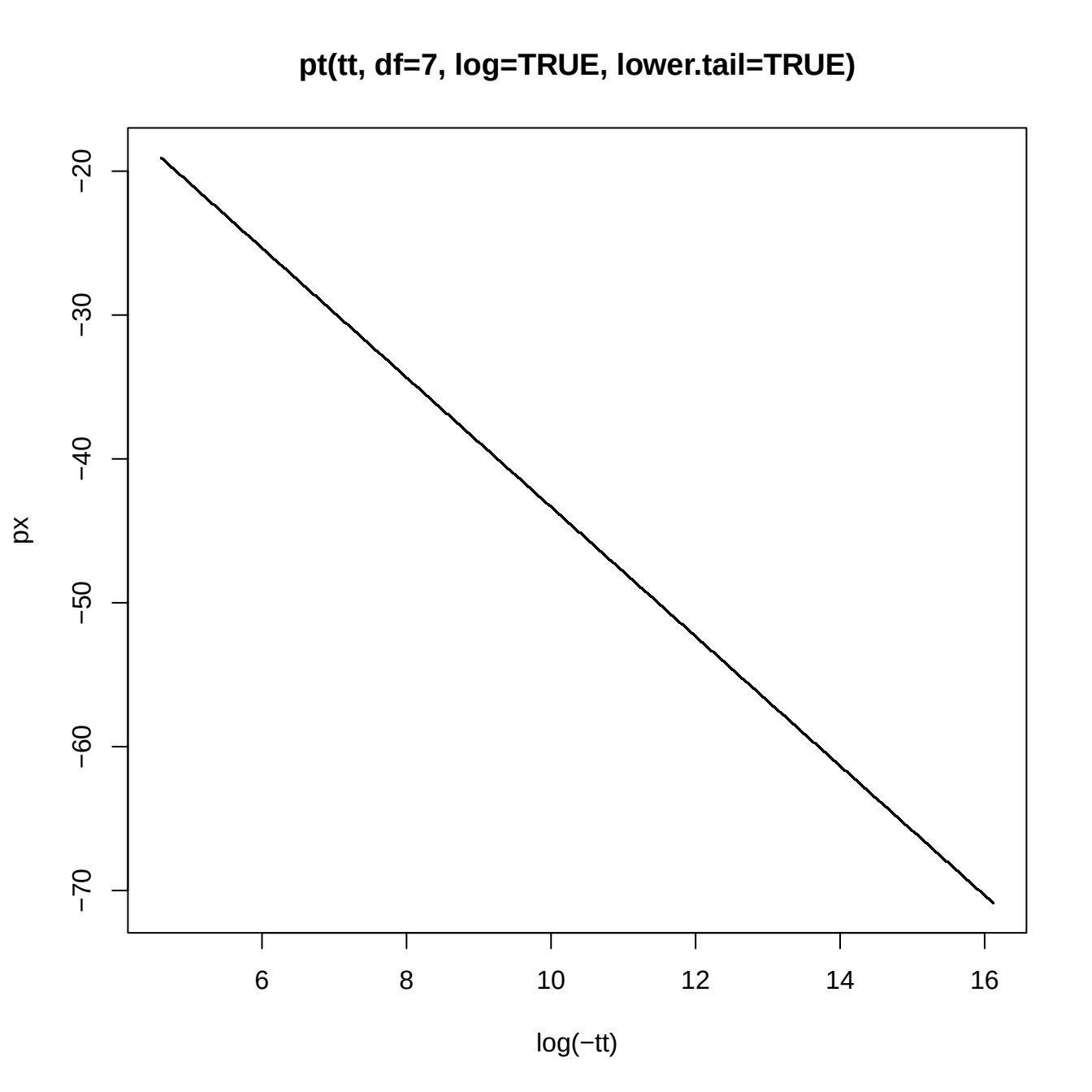

pt(x, df=7, ncp=0.01, log=TRUE, lower.tail=FALSE)
slope = −6.92538
intCpt= 4.62657
0
−5
−10
−15
−20
−25
−30
1e−01
1e+00
1e+01
1e+02
1e+03
x

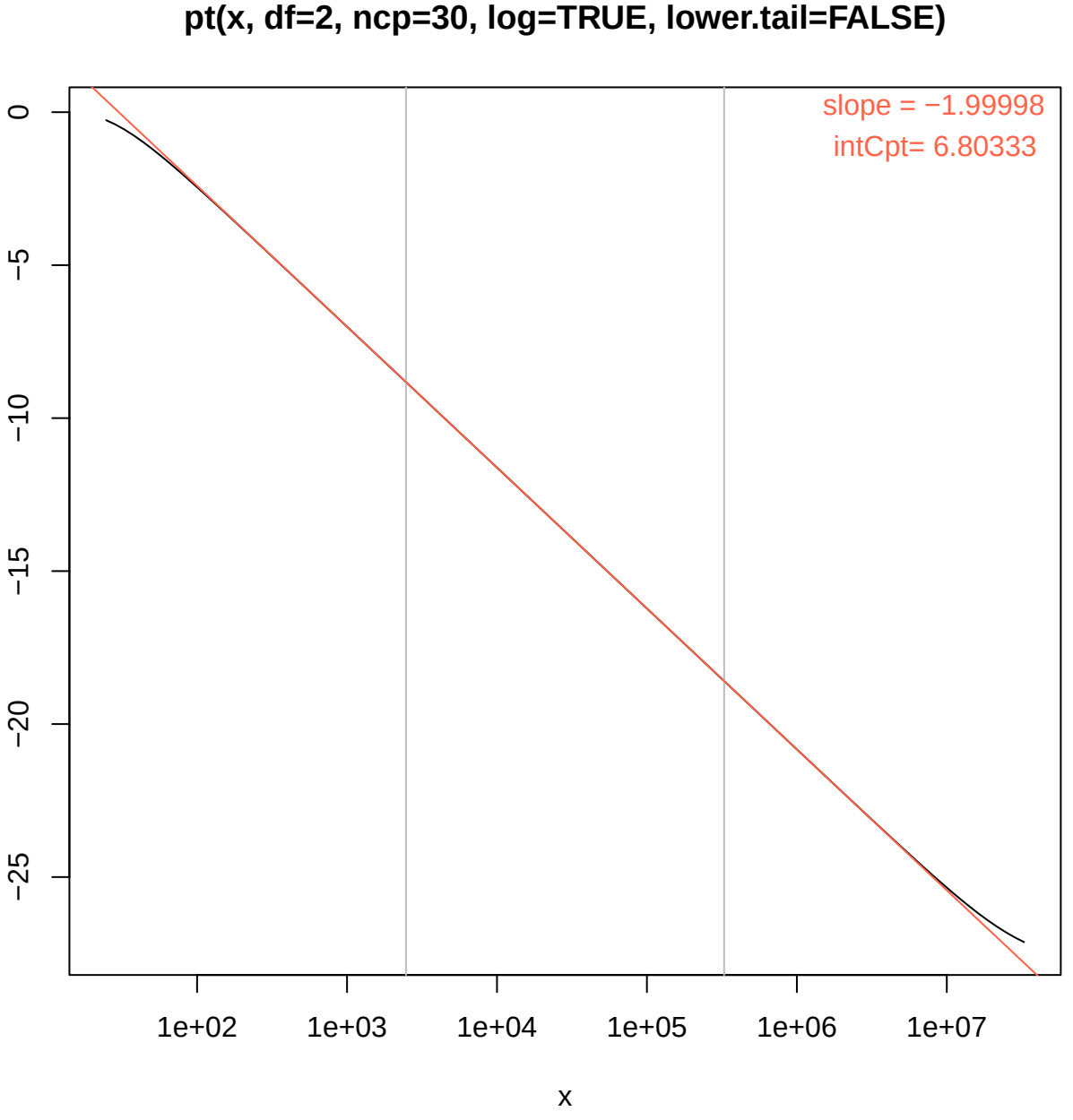

pt(exp(.), df=7, ncp=0.001, lower.tail=FALSE, log.p=TRUE)
Search for [x0, x1] s.t. pt(*, log=TRUE) is *linear* in it; starting @ [1.56599, 13.0789]
final int. [2.63865, 3.86858]
coef. = (4.60286, −6.92559)
px
0
−5
−10
−15
−20
−25
−30
−35
0
5
10
15
log(x)

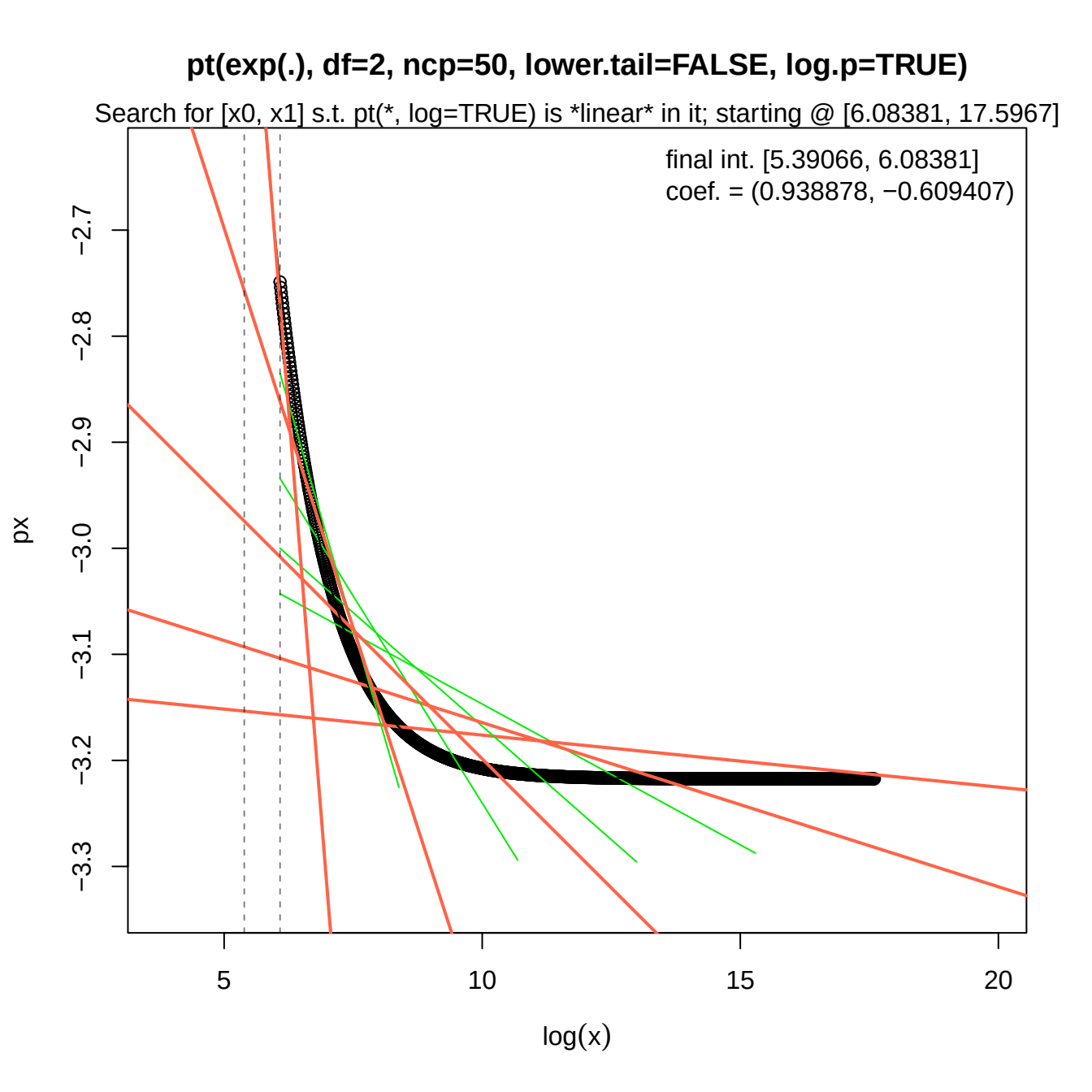

pt(x, df=7, ncp=0.001, log=TRUE, lower.tail=FALSE)
slope = −6.92559
intCpt= 4.60286
0
−5
−10
−15
−20
−25
−30
1e−01
1e+00
1e+01
1e+02
1e+03
x

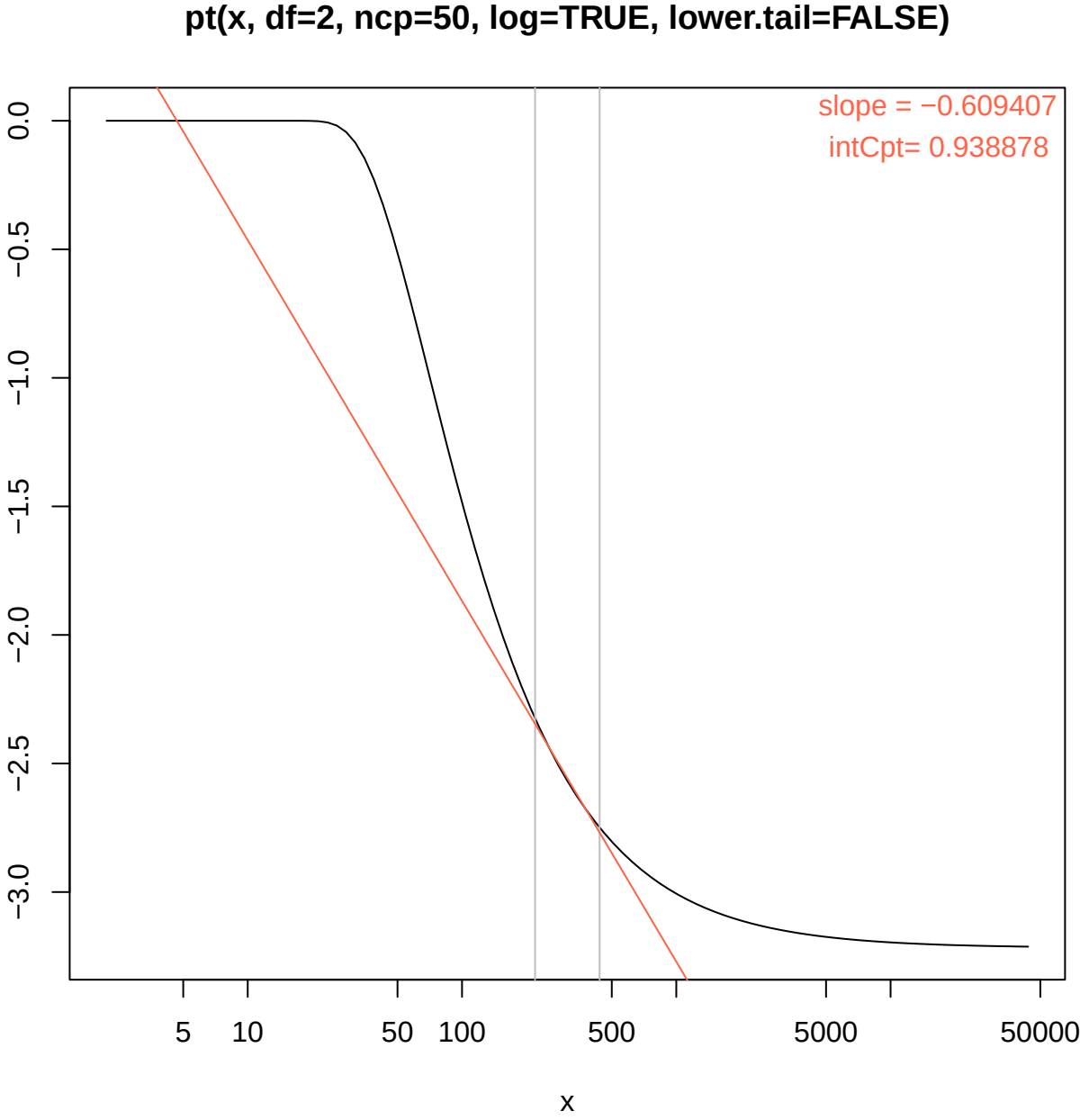

pt(tt, df=7, log=TRUE, lower.t=F)
px
−15
−20
−25
2.5
3.0
3.5
4.0
4.5
log(tt)

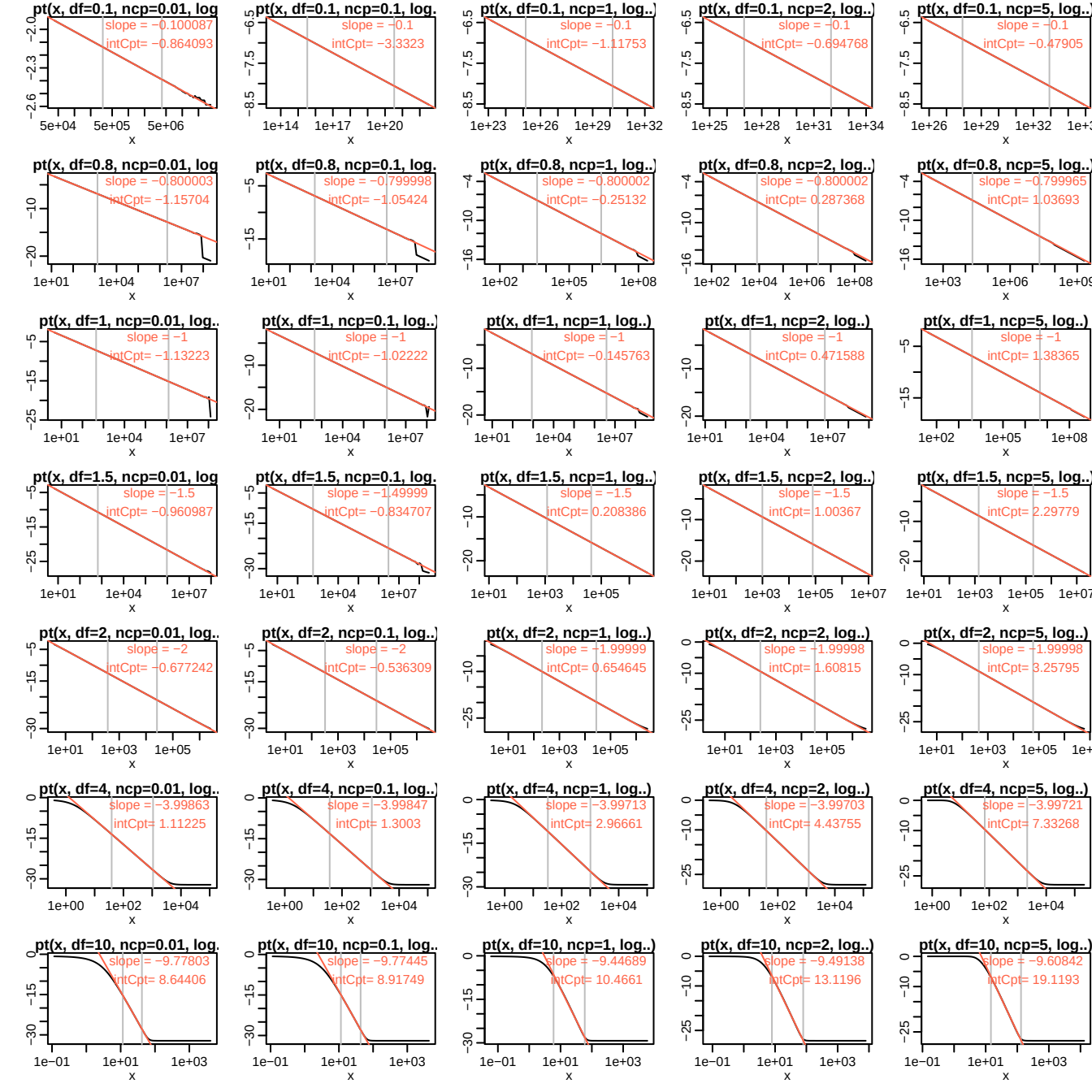

pt(tt, df=7, log=TRUE, lower.t=F) −− larger range(tt)
px
−40
−60
−80
−100
6
8
10
12
14
16
log(tt)

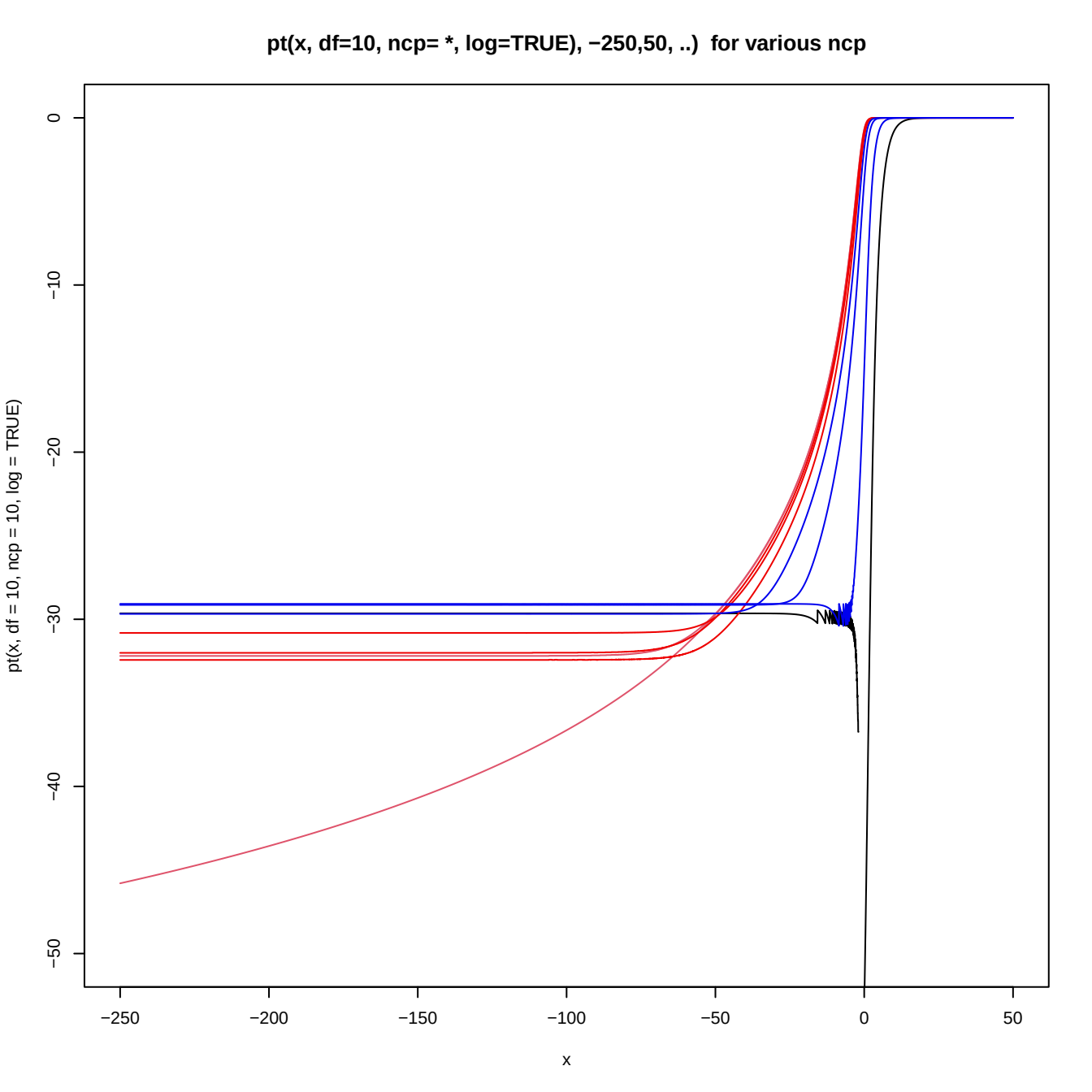

pt(tt, df=7, log=TRUE, lower.tail=TRUE)
px
−20
−30
−40
−50
−60
−70
6
8
10
12
14
16
log(−tt)

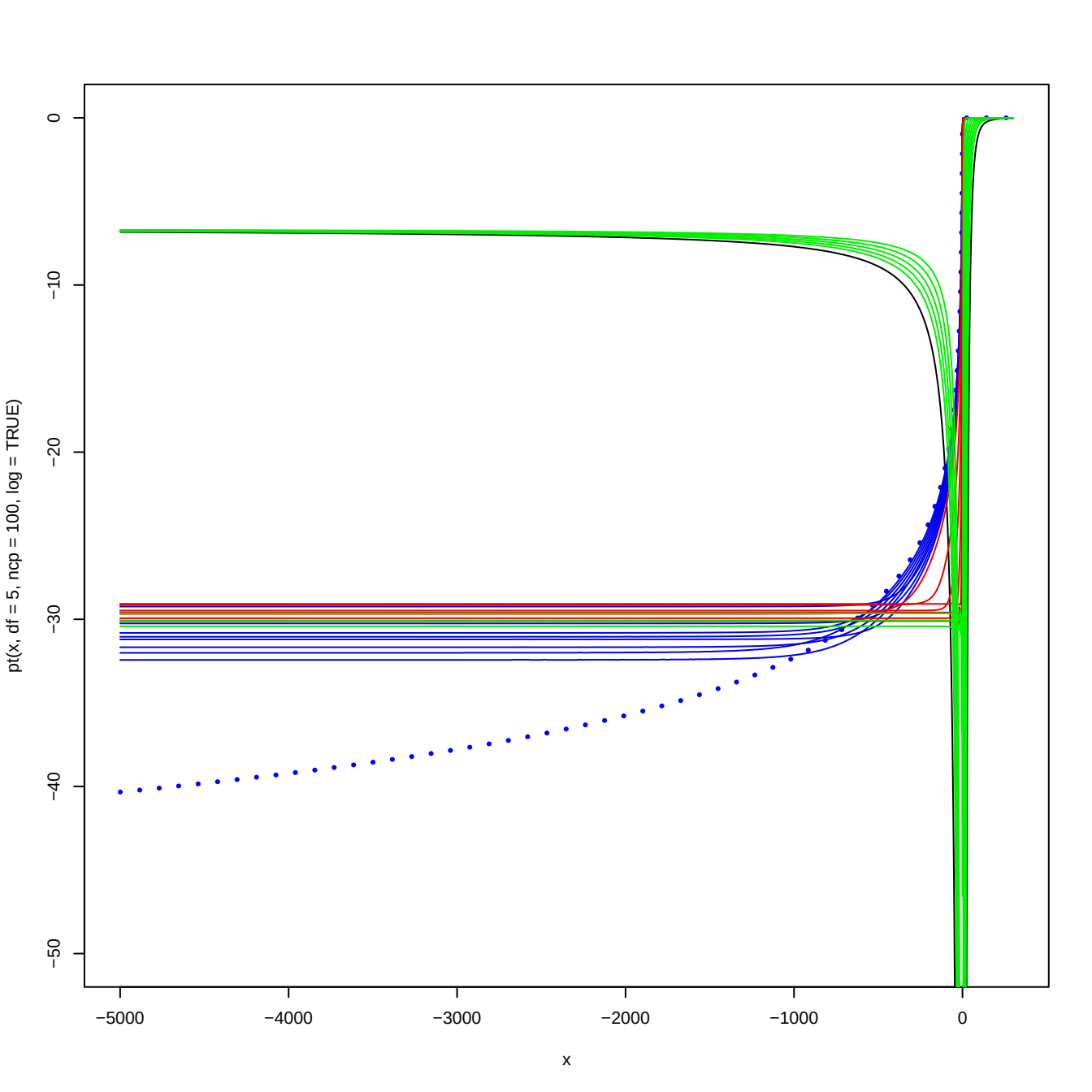

pt(x, df=2, ncp=30, log=TRUE, lower.tail=FALSE)
slope = −1.99998
intCpt= 6.80333
0
−5
−10
−15
−20
−25
1e+02
1e+03
1e+04
1e+05
1e+06
1e+07
x

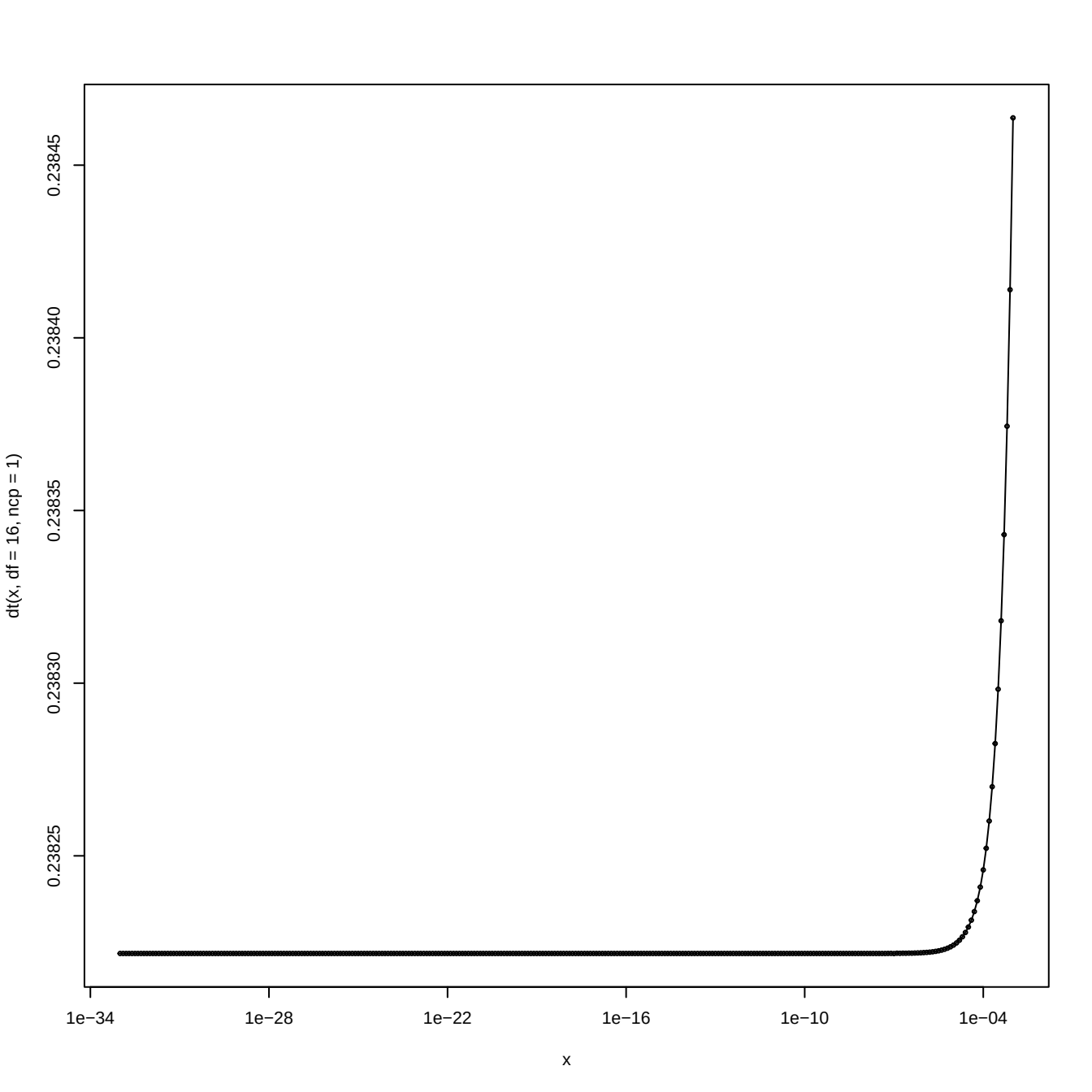

pt(exp(.), df=2, ncp=50, lower.tail=FALSE, log.p=TRUE)
Search for [x0, x1] s.t. pt(*, log=TRUE) is *linear* in it; starting @ [6.08381, 17.5967]
final int. [5.39066, 6.08381]
coef. = (0.938878, −0.609407)
px
−2.7
−2.8
−2.9
−3.0
−3.1
−3.2
−3.3
5
10
15
20
log(x)

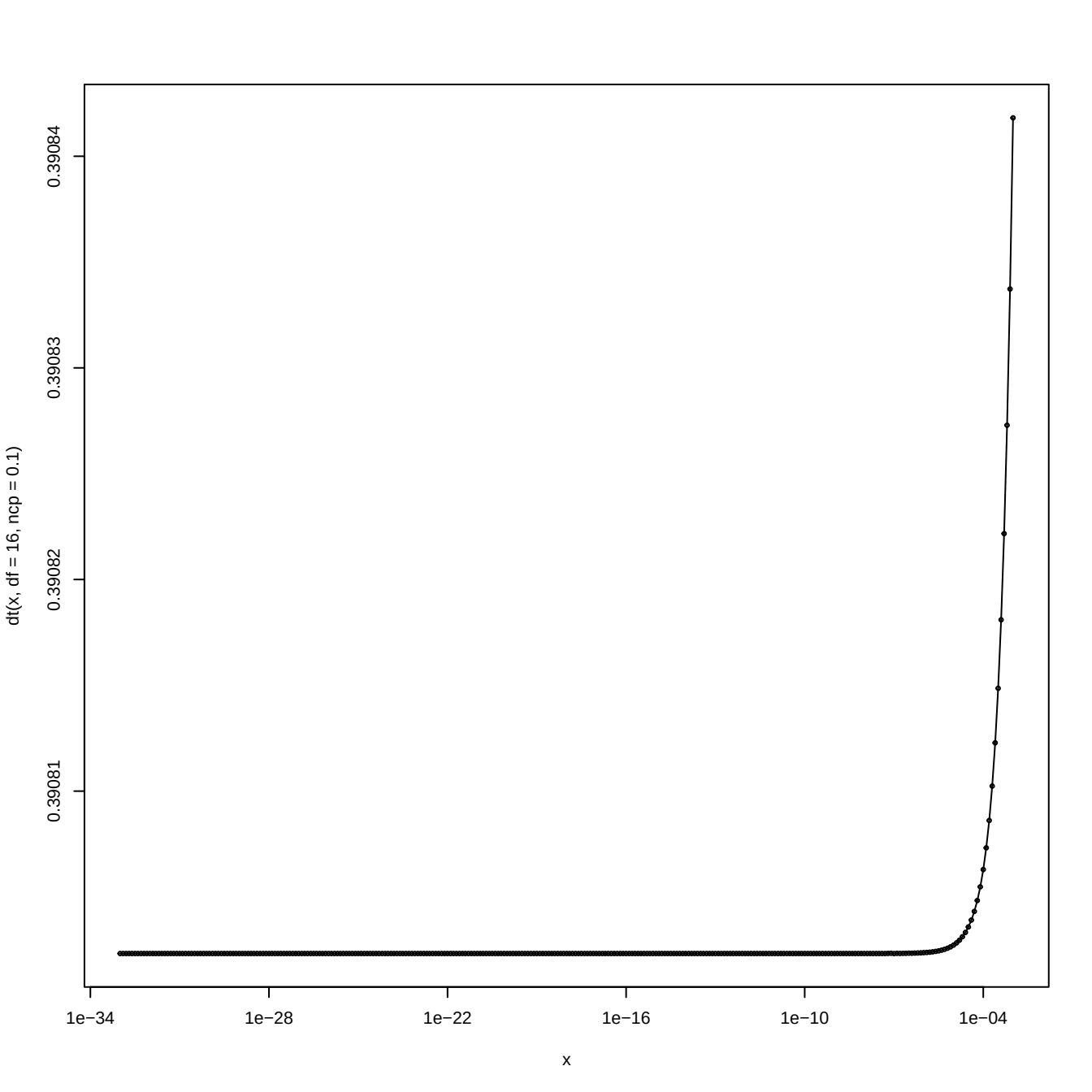

pt(x, df=2, ncp=50, log=TRUE, lower.tail=FALSE)
slope = −0.609407
intCpt= 0.938878
0.0
−0.5
−1.0
−1.5
−2.0
−2.5
−3.0
5
10
50
100
500
5000
50000
x

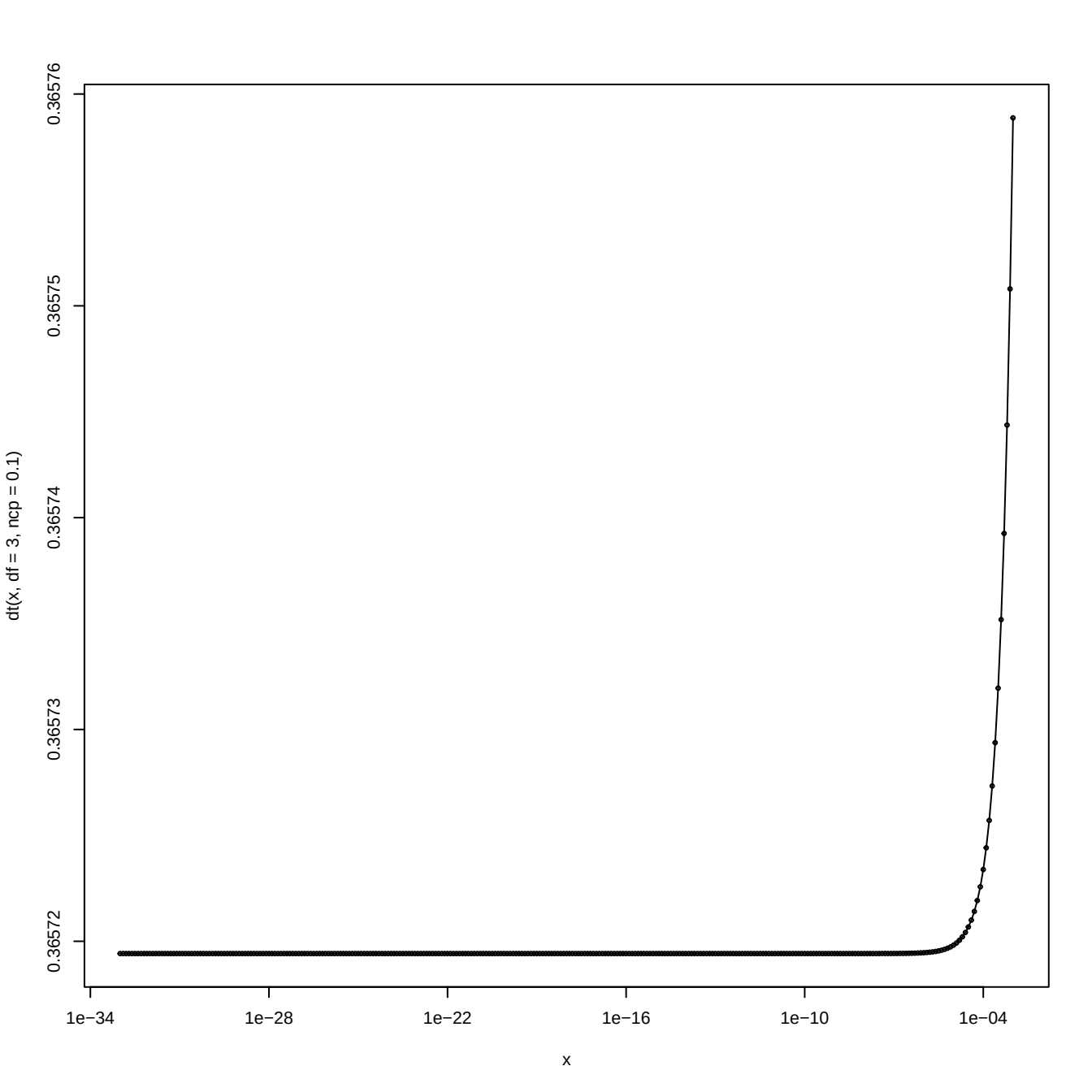

pt(x, df=0.1, ncp=0.01, log
slope = −0.100087
intCpt= −0.864093
pt(x, df=0.1, ncp=0.1, log.
slope = −0.1
intCpt= −3.3323
pt(x, df=0.1, ncp=1, log..
slope = −0.1
intCpt= −1.11753
pt(x, df=0.1, ncp=2, log..
slope = −0.1
intCpt= −0.694768
pt(x, df=0.1, ncp=5, log..
slope = −0.1
intCpt= −0.47905
pt(x, df=0.8, ncp=0.01, log
slope = −0.800003
intCpt= −1.15704
pt(x, df=0.8, ncp=0.1, log.
slope = −0.799998
intCpt= −1.05424
pt(x, df=0.8, ncp=1, log..
slope = −0.800002
intCpt= −0.25132
pt(x, df=0.8, ncp=2, log..
slope = −0.800002
intCpt= 0.287368
pt(x, df=0.8, ncp=5, log..
slope = −0.799965
intCpt= 1.03693
pt(x, df=1, ncp=0.01, log..
slope = −1
intCpt= −1.13223
pt(x, df=1, ncp=0.1, log..
slope = −1
intCpt= −1.02222
pt(x, df=1, ncp=1, log..)
slope = −1
intCpt= −0.145763
pt(x, df=1, ncp=2, log..)
slope = −1
intCpt= 0.471588
pt(x, df=1, ncp=5, log..)
slope = −1
intCpt= 1.38365
pt(x, df=1.5, ncp=0.01, log
slope = −1.5
intCpt= −0.960987
pt(x, df=1.5, ncp=0.1, log.
slope = −1.49999
intCpt= −0.834707
pt(x, df=1.5, ncp=1, log..
slope = −1.5
intCpt= 0.208386
pt(x, df=1.5, ncp=2, log..
slope = −1.5
intCpt= 1.00367
pt(x, df=1.5, ncp=5, log..
slope = −1.5
intCpt= 2.29779
pt(x, df=2, ncp=0.01, log..
slope = −2
intCpt= −0.677242
pt(x, df=2, ncp=0.1, log..
slope = −2
intCpt= −0.536309
pt(x, df=2, ncp=1, log..)
slope = −1.99999
intCpt= 0.654645
pt(x, df=2, ncp=2, log..)
slope = −1.99998
intCpt= 1.60815
pt(x, df=2, ncp=5, log..)
slope = −1.99998
intCpt= 3.25795
pt(x, df=4, ncp=0.01, log..
slope = −3.99863
intCpt= 1.11225
pt(x, df=4, ncp=0.1, log..
slope = −3.99847
intCpt= 1.3003
pt(x, df=4, ncp=1, log..)
slope = −3.99713
intCpt= 2.96661
pt(x, df=4, ncp=2, log..)
slope = −3.99703
intCpt= 4.43755
pt(x, df=4, ncp=5, log..)
slope = −3.99721
intCpt= 7.33268
pt(x, df=10, ncp=0.01, log
slope = −9.77803
intCpt= 8.64406
pt(x, df=10, ncp=0.1, log..
slope = −9.77445
intCpt= 8.91749
pt(x, df=10, ncp=1, log..)
slope = −9.44689
intCpt= 10.4661
pt(x, df=10, ncp=2, log..)
slope = −9.49138
intCpt= 13.1196
pt(x, df=10, ncp=5, log..)
slope = −9.60842
intCpt= 19.1193
x


pt(x, df=10, ncp= *, log=TRUE), −250,50, ..) for various ncp
pt(x, df = 10, ncp = 10, log = TRUE)
0
−10
−20
−30
−40
−50
−250
−200
−150
−100
−50
0
50
x


0
−10
−20
−30
−40
−50
pt(x, df = 5, ncp = 100, log = TRUE)
−5000
−4000
−3000
−2000
−1000
0
x


dt(x, df = 16, ncp = 1)
0.23825
0.23830
0.23835
0.23840
0.23845
1e−34
1e−28
1e−22
1e−16
1e−10
1e−04
x


dt(x, df = 16, ncp = 0.1)
0.39084
0.39083
0.39082
0.39081
1e−34
1e−28
1e−22
1e−16
1e−10
1e−04
x


0.36576
0.36575
0.36574
0.36573
0.36572
dt(x, df = 3, ncp = 0.1)
1e−34
1e−28
1e−22
1e−16
1e−10
1e−04
x