sinx2.c

```
/* Vizsgáljuk, hogy a (PI/2)^n/n! mikor csökken 10^(-k) alá. */

#define PI 3.141592654

double hatvany(double a,int n)
{
    double v=1;
    while (--n>=0)
     v*=a;
    return v;
}

double faktorialis(int n)
{
    double v=1;
    while (n>1)
     v*=n--;
    return v;
}

main()
{
    double a;
    int n;
    for (n=1;n<=25;++n)
     printf("(PI/2)^%d/%d!=%20.18f\n",
      n,n,hatvany(PI/2,n)/faktorialis(n));
}
```

---

sinx2.out

```
  (PI/2)^1/1!=1.570796327000000048
  (PI/2)^2/2!=1.233700550458345591
  (PI/2)^3/3!=0.645964097759282541
  (PI/2)^4/4!=0.253669508033537494
  (PI/2)^5/5!=0.079692626298195540
  (PI/2)^6/6!=0.020863480779698192
  (PI/2)^7/7!=0.004681754139597860
  (PI/2)^8/8!=0.000919260275799670
  (PI/2)^9/9!=0.000160441184975903
(PI/2)^10/10!=0.000025202042405968
(PI/2)^11/11!=0.000003598843240381
(PI/2)^12/12!=0.000000471087478620
(PI/2)^13/13!=0.000000056921729316
(PI/2)^14/14!=0.000000006386603095
(PI/2)^15/15!=0.000000000668803512
(PI/2)^16/16!=0.000000000065659631
(PI/2)^17/17!=0.000000000006066936
(PI/2)^18/18!=0.000000000000529440
(PI/2)^19/19!=0.000000000000043771
(PI/2)^20/20!=0.000000000000003438
(PI/2)^21/21!=0.000000000000000257
(PI/2)^22/22!=0.000000000000000018
(PI/2)^23/23!=0.000000000000000001
(PI/2)^24/24!=0.000000000000000000
```

faktorialis.m

```
function v = faktorialis(n)
v=1;
while (n>1)
    v=v*n;
    n=n-1;
    endwhile
endfunction
```

sinx.octave

```
for n=1:25
    printf("(PI/2)^%d/%d!=%20.18f\n",n,n,(pi/2)^n/faktorialis(n));
    endfor
```

expx.octave

```
for n=1:25
    printf("2.72/%d!=%20.18f\n",n,2.72/faktorialis(n));
    endfor
```

expx.octave.out

```
GNU Octave, version 2.0.16 (i386-suse-linux-gnu).
Copyright (C) 1996, 1997, 1998, 1999, 2000 John W. Eaton.
This is free software with ABSOLUTELY NO WARRANTY.
For details, type 'warranty'.

 2.72/1!=2.720000000000000195
 2.72/2!=1.360000000000000098
 2.72/3!=0.453333333333333366
 2.72/4!=0.113333333333333341
 2.72/5!=0.022666666666666668
 2.72/6!=0.003777777777777778
 2.72/7!=0.000539682539682540
 2.72/8!=0.000067460317460317
 2.72/9!=0.000007495590828924
2.72/10!=0.000000749559082892
2.72/11!=0.000000068141734808
2.72/12!=0.000000005678477901
2.72/13!=0.000000000436805992
2.72/14!=0.000000000031200428
2.72/15!=0.000000000002080029
2.72/16!=0.000000000000130002
2.72/17!=0.000000000000007647
2.72/18!=0.000000000000000425
2.72/19!=0.000000000000000022
2.72/20!=0.000000000000000001
2.72/21!=0.000000000000000000
2.72/22!=0.000000000000000000
2.72/23!=0.000000000000000000
2.72/24!=0.000000000000000000
2.72/25!=0.000000000000000000
```

expx-horner.octave

```
x=1;
n=maxN=20
expx=1+x/n;
expx_octave=exp(x);
for i=1:maxN-1
    printf("n=%d T(n)=%20.18f\n",n,expx);
    n=maxN-i;
    expx=1+x/n*expx;
    endfor
printf("T(n)=%20.18f\n",expx);
printf("Eltérés: %20.18f\n",expx_octave-expx);
```

expx-horner.octave.out

```
n = 20
n=20 T(n)=1.050000000000000044
n=19 T(n)=1.055263157894736903
n=18 T(n)=1.058625730994152025
n=17 T(n)=1.062272101823185322
n=16 T(n)=1.066392006363949152
n=15 T(n)=1.071092800424263247
n=14 T(n)=1.076506628601733073
n=13 T(n)=1.082808202200133296
n=12 T(n)=1.090234016850011090
n=11 T(n)=1.099112183350001049
n=10 T(n)=1.109911218335000171
n= 9 T(n)=1.123234687038888883
n= 8 T(n)=1.140415433587986138
n= 7 T(n)=1.162916490512569512
n= 6 T(n)=1.193819415085428215
n= 5 T(n)=1.238763883017085732
n= 4 T(n)=1.309690970754271433
n= 3 T(n)=1.436563656918090404
n= 2 T(n)=1.718281828459045091
     T(n)=2.718281828459045091
Eltérés:  0.000000000000000000
```

log2.octave

```
log2=0;
ej=-1;
for n=1:50
    ej=-1*ej;
    log2=log2+1/(ej*n);
    printf("Eltérés a(z) %d. lépésben: %20.18f\n",n,log(2)-log2);
    endfor
```

log2.octave.out

```
Eltérés a(z) 1. lépésben:     −0.306852819440054714
Eltérés a(z) 2. lépésben:      0.193147180559945286
Eltérés a(z) 3. lépésben:     −0.140186152773387973
Eltérés a(z) 4. lépésben:      0.109813847226612027
Eltérés a(z) 5. lépésben:     −0.090186152773387929
Eltérés a(z) 6. lépésben:      0.076480513893278701
Eltérés a(z) 7. lépésben:     −0.066376628963864204
Eltérés a(z) 8. lépésben:      0.058623371036135796
Eltérés a(z) 9. lépésben:     −0.052487740074975364
Eltérés a(z) 10. lépésben:     0.047512259925024614
.................................................
Eltérés a(z) 40. lépésben:     0.012343798767251224
Eltérés a(z) 41. lépésben:    −0.012046445135187822
Eltérés a(z) 42. lépésben:     0.011763078674336014
Eltérés a(z) 43. lépésben:    −0.011492735279152400
Eltérés a(z) 44. lépésben:     0.011234537448120308
Eltérés a(z) 45. lépésben:    −0.010987684774101947
Eltérés a(z) 46. lépésben:     0.010751445660680647
Eltérés a(z) 47. lépésben:    −0.010525150084000234
Eltérés a(z) 48. lépésben:     0.010308183249333136
Eltérés a(z) 49. lépésben:    −0.010099980015973009
Eltérés a(z) 50. lépésben:     0.009900019984027009
```

---

log2b.octave

```
log2=0;
ej=-1;
log10n=0;
for n=1:100000
    ej=-1*ej;
    log2=log2+1/(ej*n);
    if (10*log10n<=n)
        printf("Eltérés a(z) %d. lépésben: %20.18f\n",n,log(2)-log2);
     log10n=n;
     endif
    endfor
```

---

log2b.octave.out

```
Eltérés a(z) 100. lépésben:    0.004975001249750255
Eltérés a(z) 1000. lépésben:   0.000499750000123034
Eltérés a(z) 10000. lépésben:  0.000049997499986798
Eltérés a(z) 100000. lépésben: 0.000004999974964170
```

4arctg1.octave

```
arctg1=0;
ej=-1;
for n=1:50
    ej=-1*ej;
    arctg1=arctg1+1/(ej*(2*n-1));
    printf("Eltérés a(z) %d. lépésben: %20.18f\n",n,pi-4*arctg1);
    endfor
```

4arctg1.octave.out

```
Eltérés a(z) 1. lépésben:     −0.858407346410206884
Eltérés a(z) 2. lépésben:      0.474925986923126153
Eltérés a(z) 3. lépésben:     −0.325074013076873669
Eltérés a(z) 4. lépésben:      0.246354558351697506
Eltérés a(z) 5. lépésben:     −0.198089886092747136
Eltérés a(z) 6. lépésben:      0.165546477543616621
Eltérés a(z) 7. lépésben:     −0.142145830148691310
Eltérés a(z) 8. lépésben:      0.124520836517975297
Eltérés a(z) 9. lépésben:     −0.110773281129083578
Eltérés a(z) 10. lépésben:     0.099753034660389872
.................................................
Eltérés a(z) 41. lépésben:    −0.024386619253422559
Eltérés a(z) 42. lépésben:     0.023806151830914946
Eltérés a(z) 43. lépésben:    −0.023252671698496652
Eltérés a(z) 44. lépésben:     0.022724339795756165
Eltérés a(z) 45. lépésben:    −0.022219480428963045
Eltérés a(z) 46. lépésben:     0.021736563527080754
Eltérés a(z) 47. lépésben:    −0.021274189161091250
Eltérés a(z) 48. lépésben:     0.020831073996803617
Eltérés a(z) 49. lépésben:    −0.020406039405258092
Eltérés a(z) 50. lépésben:     0.019998000998782128
```

4arctg1b.octave.out

```
Eltérés a(z) 100. lépésben:    0.009999750031239429
Eltérés a(z) 1000. lépésben:   0.000999999749998981
Eltérés a(z) 10000. lépésben:  0.000099999999758627
Eltérés a(z) 100000. lépésben: 0.000010000000073340
```

---

pi−szabnszog.bc

```
#!/usr/bin/bc −l
scale=99
pi=4*a(1)
r=1
x=1
n=6
m=sqrt(r*r−x*x/4);
i=1
while (i<120)
{
    print "i="; i
    print "n="; n
    print "m="; m
    print "x="; x
    print "PI−T="; pi−m*x*n/2
    x1=sqrt(x*x/4+(r−m)*(r−m))
    m1=sqrt(r*r−x1*x1/4)
    x=x1
    m=m1
    n=n*2
    i=i+1
    print "\n"
}
quit
```

pi-szabnszog.bc.out

```
i=1
n=6
m=.866025403784438646763723170752936183471402626905190314027903489 72\
596650845440001854057309337862428 7
x=1
PI-T=.543516442236477298171473871020694333782961518659534878891234 12\
312991688092300894300631554520624420 3

i=2
n=12
m=.965925826289068286749743199728897367633904839008404550402343076 31\
042321397985551634756174185807045 2
x=.517638090205041524697797675248096656698137802639861027628006414 63\
011394949760399384473594938849933 0
PI-T=.141592653589793238462643383279502884197169399375105820974944 59\
230781640628620899862803482534211707 0

i=3
n=24
m=.991444861373810411144557526928562871277738274448102271458774603 52\
892206840508253176326543345327739 7
x=.261052384440103183096812455790978020387481409623464503781233896 67\
026565045964725922848073798458424 3
PI-T=.035764112359544090275857331790922944008342583535939655206906 10\
452713270930058503555961912901112112 0

i=4
n=48
m=.997858923238603506738069791272777604531866396325966418074725629 27\
418785082869811103795654762696687 7
x=.130806258460286133630631117550350882881264607890108035663975301 49\
269381489277793057241603452303997 6
PI-T=.008964040308555041300893913787766639547392483893531775600137 83\
226462860077044188788626596952710625 6

i=5
n=96
m=.999464587476365644429836446242859945883640953153130896033687428 59\
967445829148048907082006061563036 9
x=.065438165643552284127319852634576252229925254503392393756191767 51\
463747042653478545960496708972832 6
PI-T=.002242450542926031327496562071081695046818810012512965039537 35\
648316484885953866489004999678915812 0

.....................................................................
```

i=82
n=14507109835375550096474112
m=.9999999999999999999999999999999999999999999999999765518841370 6465\
9708564369127482204071702747327079
x=.00000000000000000000000004331107559314614142547559050134973103637\
3940568988019952428897664617710192
PI−T=.00000000000000000000000000000000000000000000000011351700210183\
1930274307705527843402243526869607624

i=83
n=29014219670751100192948224
m=.99999999999999999999999999999999999999999999999999413797103426616\
4927141092281870551017925686831769
x=.00000000000000000000000021655537796570807071273779525067486551818\
6970284492855537094310296914577149
PI−T=.00000000000000000000000000000000000000000000000007501625581429\
6003179866700808805629845950461600968

i=84
n=58028439341502200385896448
m=.99999999999999999999999999999999999999999999999999853449275856654\
1231785273070467637754481421707942
x=.00000000000000000000000010827768898285403535636889762533743275909\
3485142245273329427016613063010627
PI−T=.00000000000000000000000000000000000000000000000009469932569209\
4096837848232228643359037973649646792

i=85
n=116056878683004400771792896
m=.99999999999999999999999999999999999999999999999999963362318964163\
5307946318267616909438620355426985
x=.00000000000000000000000005413884449142701767818444881266871637954\
6742571113401151752400023377281737
PI−T=.00000000000000000000000000000000000000000000000062716870925582\
0978020995473389371985416576648045768

....

i=119
n=1993841993677373809355710590420516864
m=.99999999999999999999999999999999999999999999999999999999999999999\
9999998758667082066097926752479390
x=.00000000000000000000000000000000000315129550240392666765165333694\
5585941072375977606564071493709867
PI−T=.00000000000000000000000000015241029081205646057277251223358298\
9818842633111621068186391021054026952