

Aufgabe 5.1 (Sonderbare Primzahlen III)

Vermutung: Jede ungerade Zahl ist die Summe einer Primzahl und einer Zweierpotenz.

Prüfe dies für einige zufällige ungerade Zahlen bis.

Bernd Ahrens / Michael Nüsken, 3. Dezember 2002

```
> restart:
> tesk:=proc(n::posint)
  local e, p;
  if n mod 2 = 0 then
    error "n muss ungerade sein!";
  end if;
  for e from 0 do;
    p:=n-2^e;
    if p<0 then
      userinfo(2,tesk,
        nprintf(
          "%d hat keine Zerlegung in Zweierpotenz + Primzahl."
            ,n ));
      return false;
    end if;
    if isprime(p) then
      userinfo(2,tesk,
        nprintf( "%d=%d+2^%d", n,p,e ));
      return true;
    end if;
  end do;
end proc:
> infolevel[tesk]:=1:
to 10 do
  2*rand(2..2^29)()-1;
  print(%,tesk(%));
end do:
infolevel[tesk]:=0:

36843657, true
148871517, true
254269625, true
448954285, true
426949031, false
987911609, true
377199185, true
268443113, false
744762743, true
899697463, false

> p:=proc(n::posint)
  local N,rnd,z,x;
  N:=100;
  rnd:=rand(2^(n-2)+1..2^(n-1));
  z:=0;
  to N do
    x:=2*rnd()-1;
```

```
        if tesk(x) then z:=z+1; end if;
    end do;
    evalf(z/N);
end proc;
> a:=table():
for n from 2 to 29 do
    a[n]:=p(n);
end do;
for n from n to 100-1 by 10 do
    a[n]:=p(n);
end do;
for n from n to 1000 by 100 do
    a[n]:=p(n);
end do;
```

$$a_2 := 1.$$

$$a_3 := 1.$$

$$a_4 := 1.$$

$$a_5 := 1.$$

$$a_6 := 1.$$

$$a_7 := 0.9900000000$$

$$a_8 := 0.9500000000$$

$$a_9 := 0.9900000000$$

$$a_{10} := 0.9500000000$$

$$a_{11} := 0.9300000000$$

$$a_{12} := 0.9800000000$$

$$a_{13} := 0.9400000000$$

$$a_{14} := 0.9700000000$$

$$a_{15} := 0.9400000000$$

$$a_{16} := 0.9200000000$$

$$a_{17} := 0.9000000000$$

$$a_{18} := 0.9000000000$$

$$a_{19} := 0.9400000000$$

$$a_{20} := 0.9000000000$$

$$a_{21} := 0.9500000000$$

$$a_{22} := 0.9100000000$$

$$a_{23} := 0.9400000000$$

$$a_{24} := 0.8800000000$$

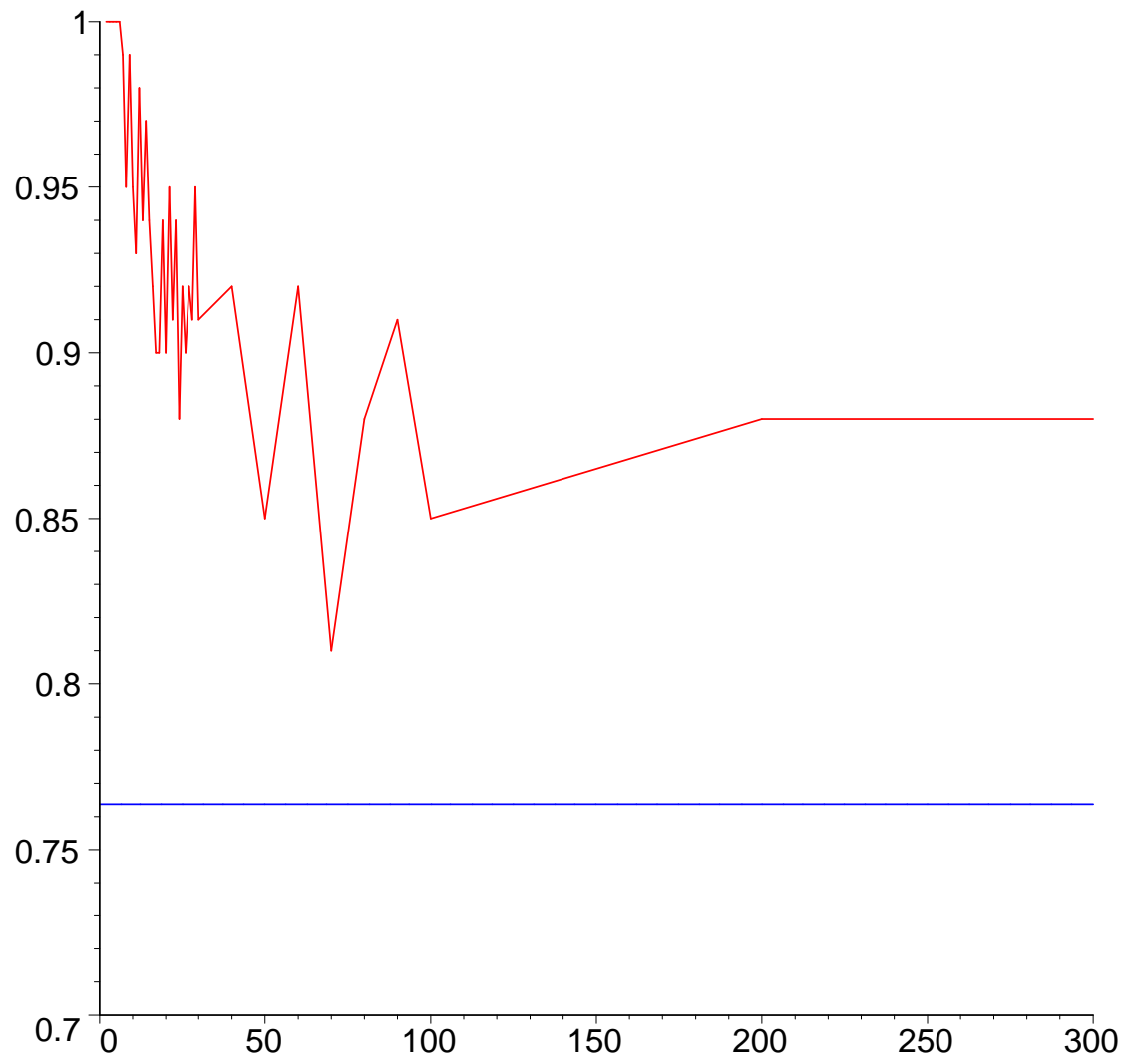
$$a_{25} := 0.9200000000$$

$$a_{26} := 0.9000000000$$

```
a27 := 0.9200000000  
a28 := 0.9100000000  
a29 := 0.9500000000  
a30 := 0.9100000000  
a40 := 0.9200000000  
a50 := 0.8500000000  
a60 := 0.9200000000  
a70 := 0.8100000000  
a80 := 0.8800000000  
a90 := 0.9100000000  
a100 := 0.8500000000  
a200 := 0.8800000000  
a300 := 0.8800000000
```

```
Warning, computation interrupted
```

```
> map( op, [indices(a)] );  
[2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29,  
 30, 40, 50, 300, 60, 70, 200, 80, 90, 100]  
> sort(map(op, [indices(a)])):  
maxN:=%[-1]:  
map( n->[n,a[n]], %% ):  
L:=plot(%):  
L:=L,plot( 1-exp(-1/log(2)), 0..maxN,0.7..1,color=blue):  
plots[display]([L]);
```



[>

+ Abschätzungen

[>