

Uebung11(2)+11(3)

last edited on December 22, 2011 03:11 PM by admin

[Save](#) [Save & quit](#) [Discard & quit](#)

[File...](#) [Action...](#) [Data...](#) [sage](#) [Typeset](#)

[Print](#) [Worksheet](#) [Edit](#) [Text](#) [Undo](#) [Share](#) [Publish](#)

```
maxima.load('interpol')
"/Applications/sage/local/share/maxima/5.20.1/share/numeric/int
"
```

Aufgabe 11.2

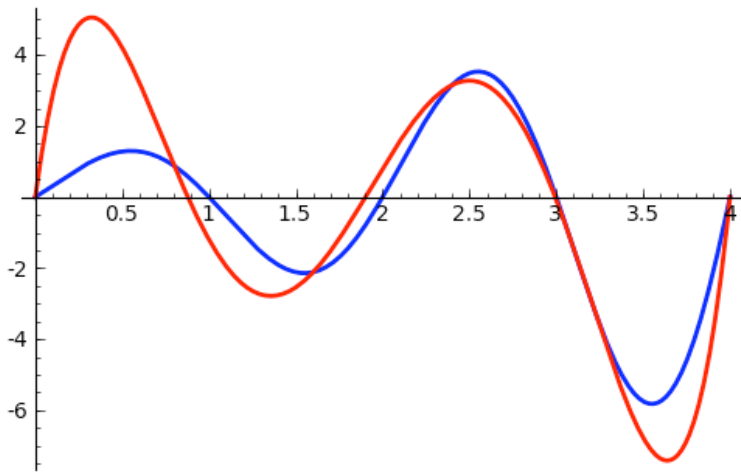
```
a=0
b=4
n=6
f(x)=exp(0.5*x)*sin(pi*x)
pts=[(a+(b-a)*i/(n-1),N(f(a+(b-a)*i/(n-1)))) for i in [0..n-1]]
html.table(pts)
```

0	0.0000000000000000
$\frac{4}{5}$	0.876872556279217
$\frac{8}{5}$	-2.11661520232433
$\frac{12}{5}$	3.15761883423041
$\frac{16}{5}$	-2.91131941318588
4	0.0000000000000000

```
polyf(x) = maxima.lagrange(pts).sage()
view(polyf)
```

$$x \mapsto \frac{1}{125} (0.111500111425x - 0.446000445699)(5x - 16)(5x - 12)(5x - 8)x + \frac{1}{125} (0.111500111425x - 0.446000445699)(5x - 16)(5x - 12)(5x - 8)$$

```
gr1=plot(f(x),(x,0,4),plot_points=100,thickness=2,color='blue')
gr2=plot(polyf(x),(x,0,4),plot_points=100,thickness=2,color='red')
P=show(gr1+gr2)
```



Aufgabe 11.3 a)

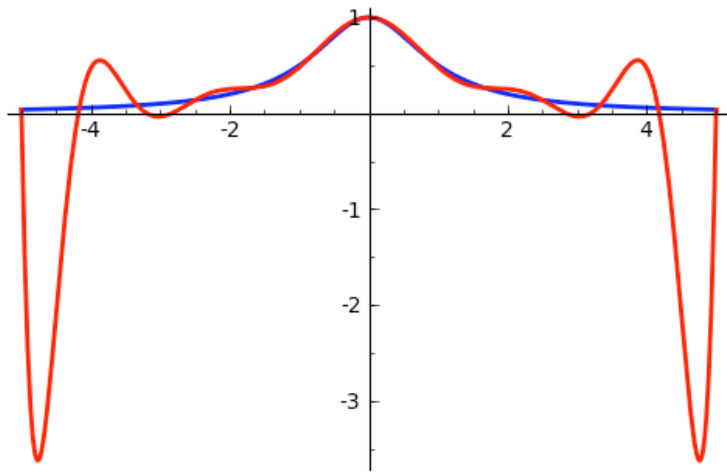
```
g(x)=1/(1+x^2)
n=12
pts=[(-5+10*i/n,N(g(-5+10*i/n))) for i in [0..n]]
html.table(pts)
```

-5	0.0384615384615385
$-\frac{25}{6}$	0.0544629349470499
$-\frac{10}{3}$	0.0825688073394495
$-\frac{5}{2}$	0.137931034482759
$-\frac{5}{3}$	0.264705882352941
$-\frac{5}{6}$	0.590163934426229
0	1.000000000000000
$\frac{5}{6}$	0.590163934426229
$\frac{5}{3}$	0.264705882352941
$\frac{5}{2}$	0.137931034482759
$\frac{10}{3}$	0.0825688073394495
$\frac{25}{6}$	0.0544629349470499
5	0.0384615384615385

```
polyg(x) = maxima.lagrange(pts).sage()
view(polyg)
```

$x \mapsto \frac{1}{419904} ((7.1592023976 \times 10^{-10}) x - 3.5796011988 \times 10^{-09})(2x - 5)(2x + 5)(3x -$

```
gr1=plot(g(x),(x,-5,5),plot_points=100,thickness=2,color='blue')
gr2=plot(polyg(x),(x,-5,5),plot_points=100,thickness=2,color='red')
Q=show(gr1+gr2)
```



Aufgabe 11.3 b)

```
g(x)=1/(1+x^2)
n=12
ptscheb=[(5*cos((2*i+1)*pi/(2*(n+1))),N(g(5*cos((2*i+1)*pi/(2*(n+1)))))) for i in [0..n]]
html.table(ptscheb)
```

$5 \cos\left(\frac{1}{26} \pi\right)$	0.0390064697692890
$5 \cos\left(\frac{3}{26} \pi\right)$	0.0437514518741643
$5 \cos\left(\frac{5}{26} \pi\right)$	0.0557644831148746
$5 \cos\left(\frac{7}{26} \pi\right)$	0.0833799462196104
$5 \cos\left(\frac{9}{26} \pi\right)$	0.156269761633290
$5 \cos\left(\frac{11}{26} \pi\right)$	0.411218082022904
0	1.00000000000000
$5 \cos\left(\frac{15}{26} \pi\right)$	0.411218082022904
$5 \cos\left(\frac{17}{26} \pi\right)$	0.156269761633290
$5 \cos\left(\frac{19}{26} \pi\right)$	0.0833799462196104
$5 \cos\left(\frac{21}{26} \pi\right)$	0.0557644831148746
$5 \cos\left(\frac{23}{26} \pi\right)$	0.0437514518741643
$5 \cos\left(\frac{25}{26} \pi\right)$	0.0390064697692890

```
polygcheb(x) = maxima.lagrange(ptscheb).sage()
view(polygcheb)
```

$x \mapsto \frac{(-1.59770500175 \times 10^{-10})(x-5 \cos(\frac{23}{26} \pi))(x-5 \cos(\frac{21}{26} \pi))(x-5 \cos(\frac{19}{26} \pi))(x-5 \cos(\frac{17}{26} \pi))}{(\cos(\frac{23}{26} \pi)-\cos(\frac{25}{26} \pi))(\cos(\frac{21}{26} \pi)-\cos(\frac{25}{26} \pi))(\cos(\frac{19}{26} \pi)-\cos(\frac{25}{26} \pi))(\cos(\frac{17}{26} \pi)-\cos(\frac{25}{26} \pi))(\cos(\frac{15}{26} \pi)-\cos(\frac{25}{26} \pi))}$

```
gr1=plot(g(x),(x,-5,5),plot_points=100,thickness=2,color='blue')
gr2=plot(polygcheb(x),(x,-5,5),plot_points=100,thickness=2,color='red')
Q=show(gr1+gr2)
```

