Lektion 3

Funktionen

$f := x \to x^3$

$$x \to x^3 \quad \textbf{(1.1)}$$

$f(3)$

$$27 \quad \textbf{(1.2)}$$

$a := x^3$

$$x^3 \quad \textbf{(1.3)}$$

$eval(a, x = 3)$

$$27 \quad \textbf{(1.4)}$$

Das folgende ist ein Syntaxfehler. Maple schlägt interaktiv eine Lösung vor.
Punktabzug in der Prüfung!

$g(x) := x - x^4$

$$x \to x - x^4 \quad \textbf{(1.5)}$$

$g(3)$

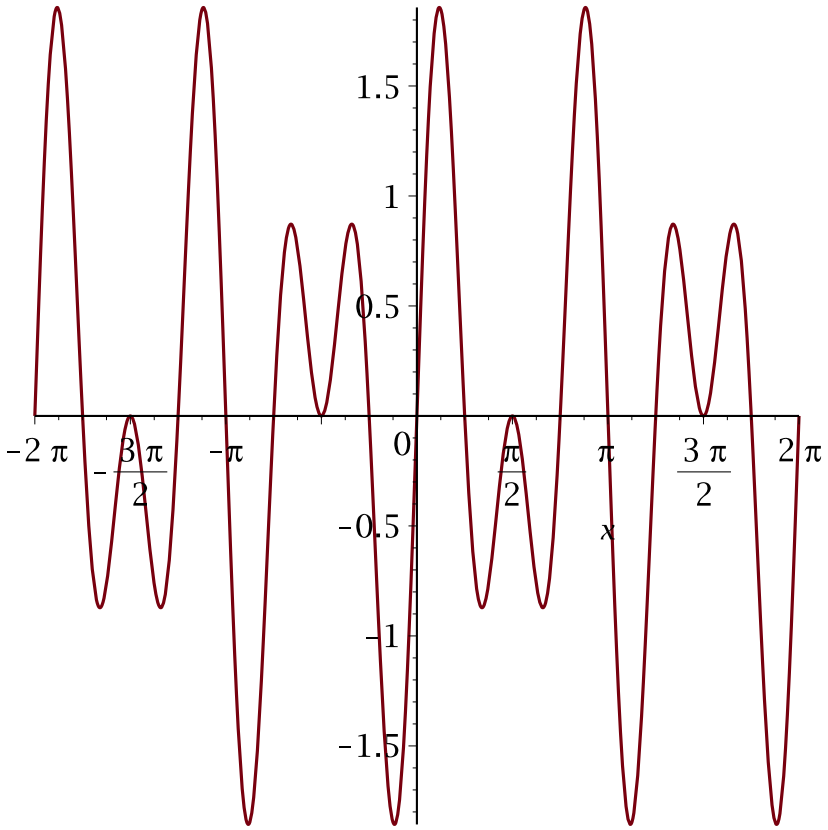
$$-78 \quad \textbf{(1.6)}$$

Funktionsgraphen

$a := \sin(3 \cdot x) + \sin(5 \cdot x)$

$$\sin(3\,x) + \sin(5\,x) \quad \textbf{(2.1)}$$

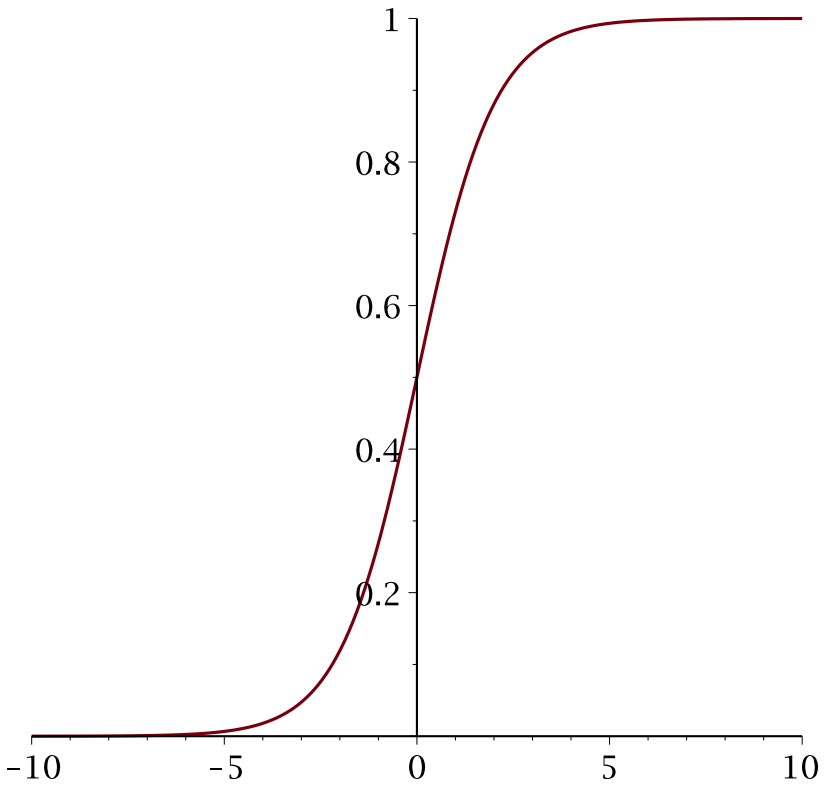
$plot(a, x = -2\,\mathrm{Pi}..2\,\mathrm{Pi})$



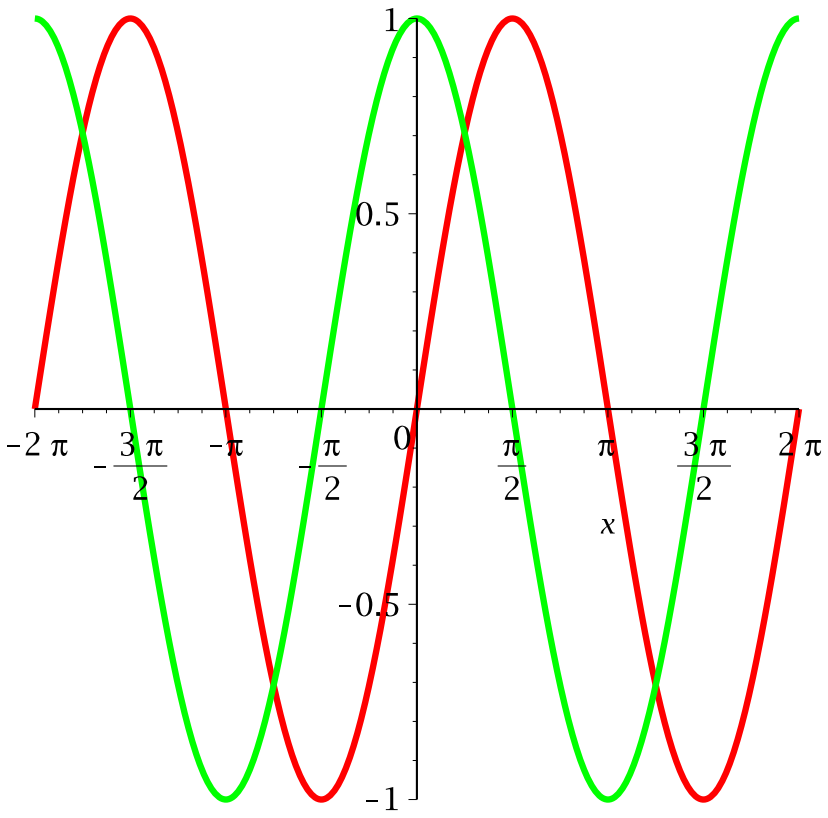
$$f := x \to \frac{\exp(x)}{1 + \exp(x)}$$

$$x \to \frac{e^x}{1 + e^x} \qquad \textbf{(2.2)}$$

$$plot(f, -10..10)$$



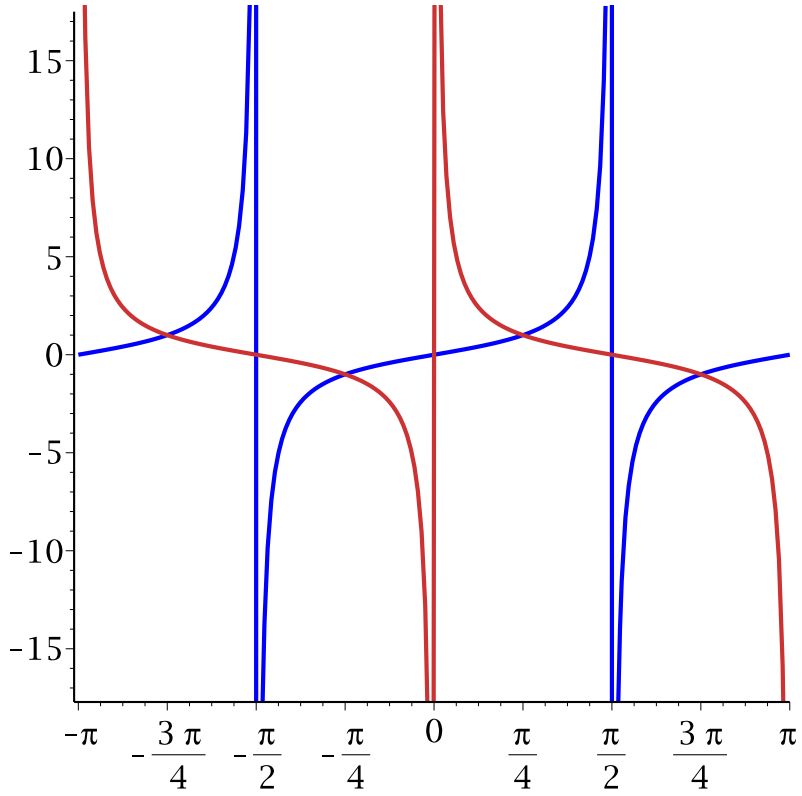
$plot([\sin(x), \cos(x)], x = -2 \cdot \mathrm{Pi}..2 \cdot \mathrm{Pi}, color = [red, green], thickness = 3)$



optionen := *color* = [*blue*, *orange*], *thickness* = 2, *axes* = *framed*

color = [*blue*, *orange*], *thickness* = 2, *axes* = *framed* **(2.3)**

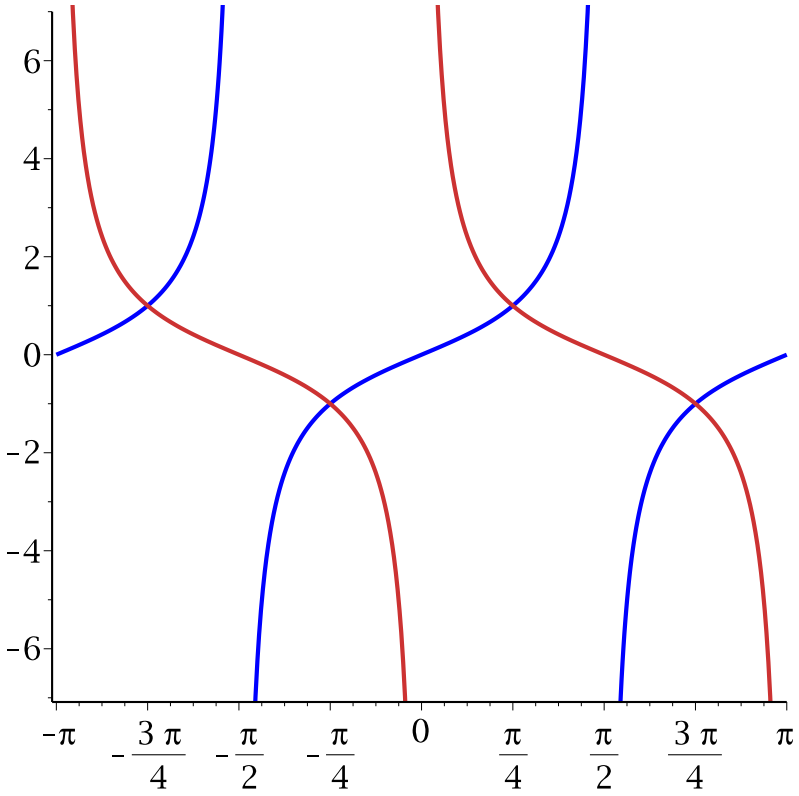
plot([tan, cot], -Pi..Pi, *optionen*)



optionen := *optionen*, *discont* = *true*

color = [*blue*, *orange*], *thickness* = 2, *axes* = *framed*, *discont* = *true* **(2.4)**

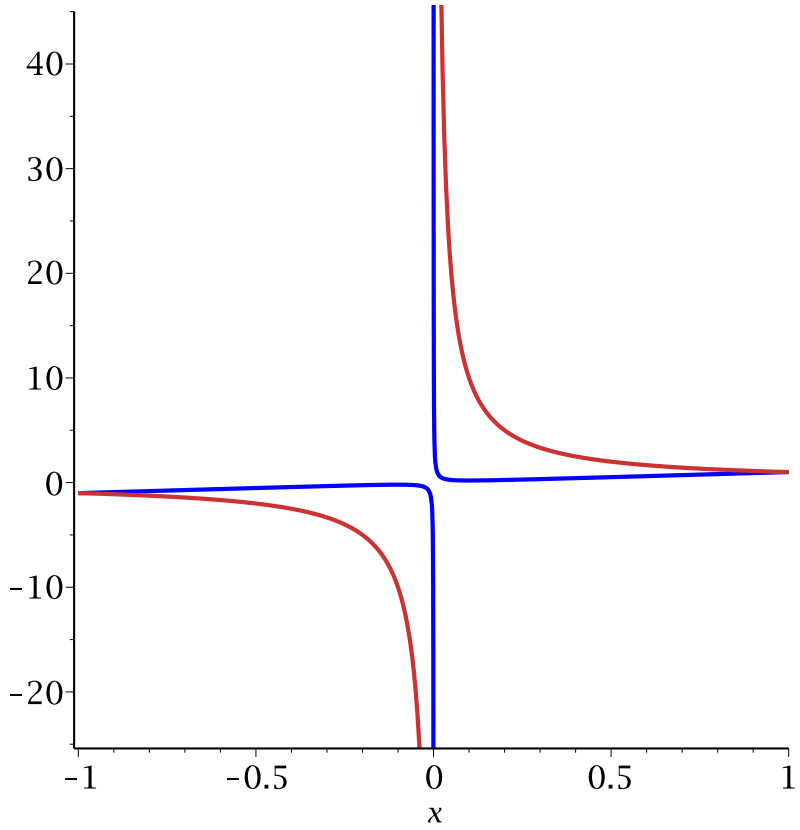
plot([tan, cot], -Pi..Pi, *optionen*)



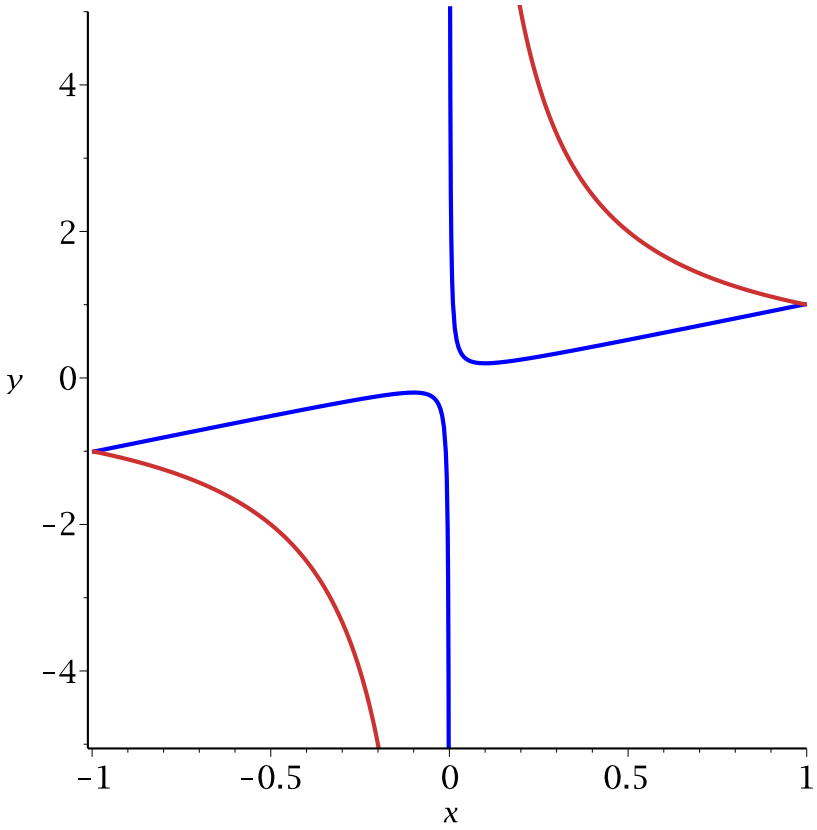
$$l := \left[\frac{(100 \cdot x^2 + 1)}{100 \cdot x}, \frac{1}{x} \right]$$

$$\left[\frac{1}{100} \; \frac{100\,x^2 + 1}{x}, \frac{1}{x} \right] \qquad \textbf{(2.5)}$$

$plot(l, x = -1..1, optionen)$



$plot(l, x = -1..1, y = -5..5, optionen)$

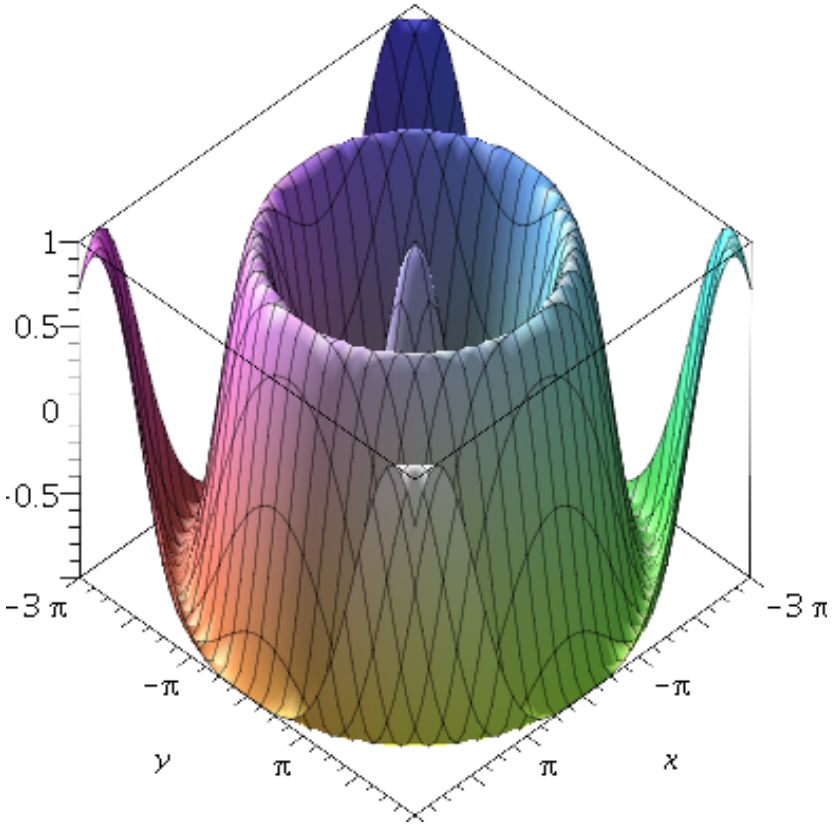


3D-Funktionsgraphen

$f := \cos(\mathrm{sqrt}(x^2 + y^2))$

$$\cos\left(\sqrt{x^2 + y^2}\right) \qquad \textbf{(2.1.1)}$$

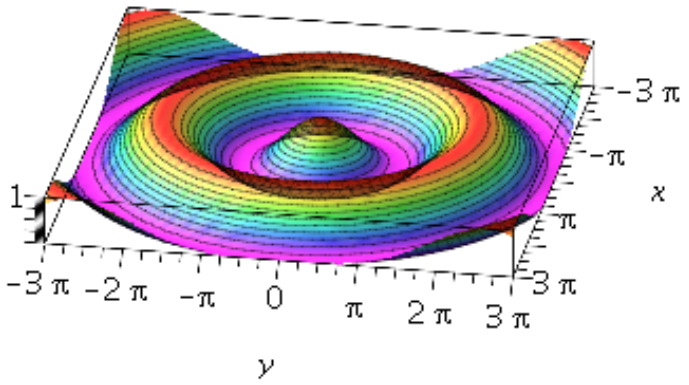
$plot3d(f, x = -3 \cdot \mathrm{Pi}..3 \cdot \mathrm{Pi}, y = -3 \cdot \mathrm{Pi}..3 \cdot \mathrm{Pi})$



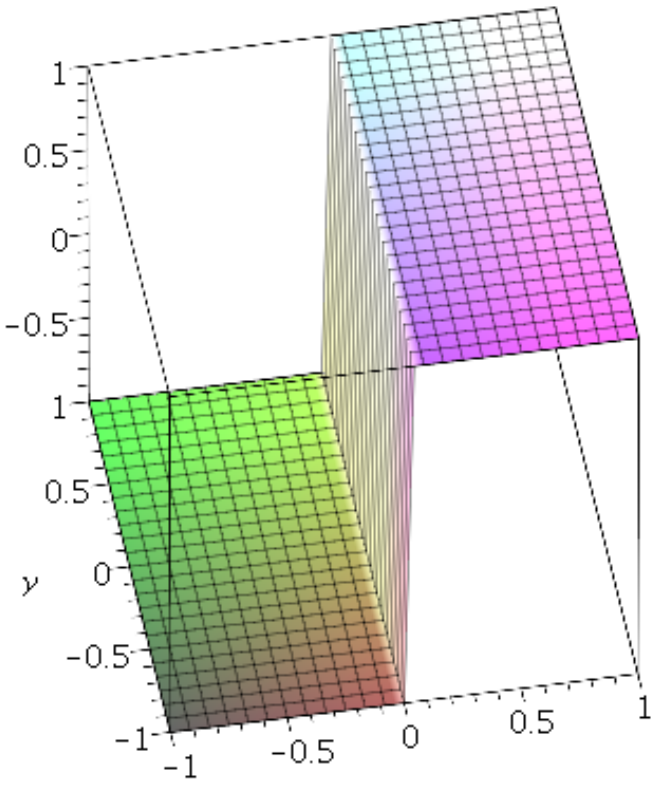
optionen := *style* = *patchcontour*, *shading* = *zhue*, *axes* = *boxed*, *transparency* = 0.2, *orientation* = [10, 66], *scaling* = *constrained*

style = *patchcontour*, *shading* = *zhue*, *axes* = *boxed*, *transparency* = 0.2, *orientation* = [10, 66], *scaling* = *constrained* **(2.1.2)**

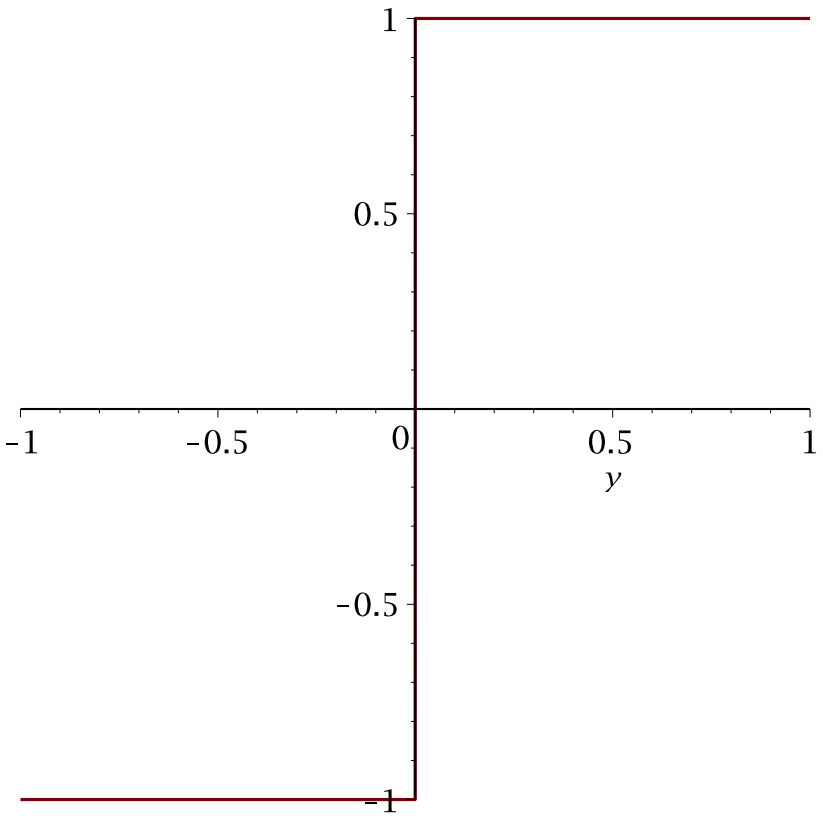
plot3d(*f*, *x* = -3 Pi..3 Pi, *y* = -3 Pi..3 Pi, *optionen*)



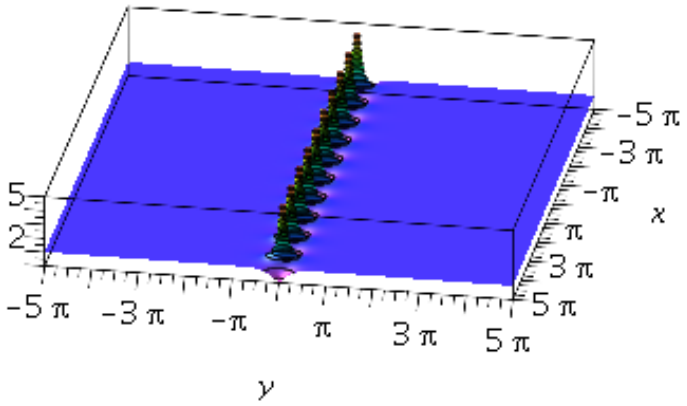
$$plot3d(\mathrm{csgn}(x + I \cdot y),\ x = -1..1,\ y = -1..1,\ orientation = [-100,\ 45])$$



$plot(\mathrm{csgn}(I \cdot y),\ y = -1..1)$



$plot3d(\mathrm{abs}(\tan(x + I \cdot y)), x = -5 \cdot \mathrm{Pi}..5 \cdot \mathrm{Pi}, y = -5 \cdot \mathrm{Pi}..5 \cdot \mathrm{Pi}, numpoints = 130000, optionen, view = 0..5)$



Listen, Mengen und Folgen

restart

liste := [*a*, *b*, *c*, *a*]

[*a*, *b*, *c*, *a*] **(3.1)**

menge := {*A*, *B*, *A*, *c*}

{*A*, *B*, *c*} **(3.2)**

folge := *x*, *z*, *y*, *x*

x, *z*, *y*, *x* **(3.3)**

[*folge*]

[*x*, *z*, *y*, *x*] **(3.4)**

{*folge*}

{*x*, *y*, *z*} **(3.5)**

convert(*liste*, *set*)

{*a*, *b*, *c*} **(3.6)**

```
convert(menge, list)
```

$$[A, B, c] \tag{3.7}$$

```
op(liste)
```

$$a, b, c, a \tag{3.8}$$

```
op(a + b)
```

$$a, b \tag{3.9}$$

```
nops(liste)
```

$$4 \tag{3.10}$$

```
nops(list)
```

$$1 \tag{3.11}$$

```
a$30
```

$$a, a, a, a, a, a, a, a, a, a, a, a, a, a, a, a, a, a, a, a, a, a, a, a, a, a, a, a \tag{3.12}$$

```
liste := [3$10]
```

$$[3, 3, 3, 3, 3, 3, 3, 3, 3, 3] \tag{3.13}$$

```
liste := [seq(j, j = 1..100)]
```

$$[1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100] \tag{3.14}$$

```
convert(liste, `+`)
```

$$5050 \tag{3.15}$$

Schleifen

```
summe := 0
```

$$0 \tag{4.1}$$

```
for l in liste do
  summe := summe + l
 end do :
summe, l
```

$$5050, 100 \tag{4.2}$$

```
summe := 0
```

$$0 \tag{4.3}$$

```
for j from 1 to 100 do
   summe := summe + j
 end do:
summe
```

$$5050 \tag{4.4}$$

```
for j from 2 to 5 do
```

$j, \mathit{simplify}\left(\sin\left(\frac{\mathrm{Pi}}{j}\right)\right)$

end do

$$2,\ 1$$

$$3,\ \frac{1}{2}\sqrt{3}$$

$$4,\ \frac{1}{2}\sqrt{2}$$

$$5,\ \sin\left(\frac{1}{5}\,\pi\right) \qquad \textbf{(4.5)}$$