

Blatt 3

Aufgabe 9

```
> restart;
```

```
> Leibnitz := Sum((-1)^k/(2*k + 1), k = 0..n);
```

$$Leibnitz := \sum_{k=0}^n \frac{(-1)^k}{2k+1} \quad (1.1)$$

```
> Limit(Leibnitz, n = infinity) = limit(Leibnitz, n = infinity);
```

$$\lim_{n \rightarrow \infty} \sum_{k=0}^n \frac{(-1)^k}{2k+1} = \frac{\pi}{4} \quad (1.2)$$

```
> Log := Sum(-(-x)^k/k, k = 1..n);
```

$$Log := \sum_{k=1}^n -\frac{(-x)^k}{k} \quad (1.3)$$

```
> Limit(Log, n = infinity) = limit(Log, n = infinity);
```

$$\lim_{n \rightarrow \infty} \sum_{k=1}^n -\frac{(-x)^k}{k} = \ln(1+x) \quad (1.4)$$

```
> Sin := Sum((-1)^k * x^(2*k+1) / (2*k+1)!, k = 0..n);
```

$$Sin := \sum_{k=0}^n \frac{(-1)^k x^{2k+1}}{(2k+1)!} \quad (1.5)$$

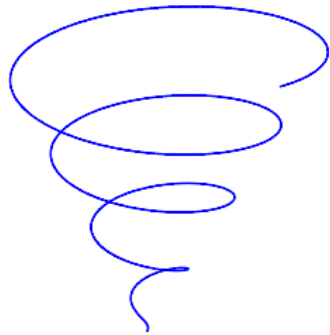
```
> Limit(Sin, n = infinity) = limit(Sin, n = infinity);
```

$$\lim_{n \rightarrow \infty} \sum_{k=0}^n \frac{(-1)^k x^{2k+1}}{(2k+1)!} = \sin(x) \quad (1.6)$$

Aufgabe 10

```
> restart: with(plots):
```

```
> spacecurve([t*sin(t), t*cos(t), t], t=0..8*Pi, numpoints = 500, color = blue, axes = none, orientation = [ 50, 68, 6 ]);
```

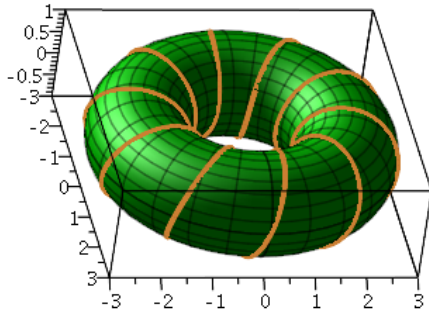


```
> T:=(s,t) -> [ (2 + cos(t)) * cos(s), (2 + cos(t)) * sin(s), sin(t)];  
       $T := (s, t) \mapsto [(2 + \cos(t)) \cos(s), (2 + \cos(t)) \sin(s), \sin(t)]$  (2.1)
```

```
> p1 := plot3d(T(s, t), s = 0..2*Pi, t = 0..2*Pi, color = [0, 0.5, 0]);  
       $p1 := PLOT3D(...)$  (2.2)
```

```
> p2 := spacecurve(T(s, 10*s), s = 0..2*Pi, thickness=4, numpoints=600, color = gold);  
       $p2 := PLOT3D(...)$  (2.3)
```

```
> display([ p1, p2 ], scaling = constrained, orientation = [ 0, 55, 13 ]);
```

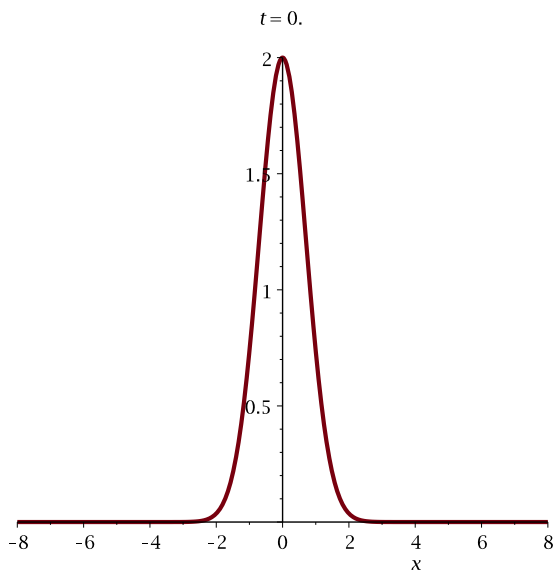


▼ Aufgabe 11

```
> restart;  
> with(plots):  
> u := (x, t) -> exp(-(x-t)^2) + exp(-(x+t/2)^2);  

$$u := (x, t) \mapsto e^{-(x-t)^2} + e^{-\left(x + \frac{t}{2}\right)^2}$$
  
> animate(plot, [ u(x, t), x=-8..8, thickness=3 ], t = 0..10, frames = 50);
```

(3.1)



▼ Aufgabe 12

```

[> restart:
[> with(plots):
> F := (x, y) -> sin(x);

```

$$F := (x, y) \mapsto \sin(x)$$

(4.1)

```

[> ?tubeplot
> tubeplot({ [cos(t), sin(t), 0], [ 1/sqrt(2) * sin(t), 1+1/sqrt(2) * sin(t), cos(t) ] }, t = 0.
.4*Pi, radius = 0.1, scaling = constrained, color = F);

```

