

Computergestuetzte Mathematik zur Analysis

Lektion 1

Maple rechnet symbolisch

```
[> 2/7  
[> (2/7)^49  
[> 70!  
[> 500!  
[> 70!/2^7  
[> 2/3; 3/4; 3/2 # Trennzeichen ;
```

und numerisch mit beliebiger Praezision

```
[> evalf(2/7)  
[> evalf(2/7, 200)  
[> evalf(Pi, 300)
```

Zuordnung / Namen

```
[> f := (a + b)^2  
[> a := 2; b := 5;  
[> f;  
[> a := 'a'  
[> f;
```

Achtung Reihenfolge

```
[> restart;  
[> a := 5;  
[> b := 2;  
[> f := (a + b)^2  
[> a := 'a'  
[> f;
```

Polynome und rationale Funktionen

```

> P := (x^2 + 2*x + 1)
> Q := (x + 1);
> P/Q
> simplify(%) # % dito Operator das letzte ausgegebene Ergebnis
> factor(P);
>

```

▼ Konstanten

```

> Pi
> gamma
> evalf(gamma, 10)
> Catalan;
> constants

```

▼ Elementare Funktionen

```

> sin(Pi/2)
> cos(Pi)
> tan(Pi/2)
> arccot(1);
> exp(1)
> log(exp(1))

```

▼ Funktionen

```

> f := x -> sin(x);
> plot(f(x), x = 0..10);
> ff := sin(x);
> plot(ff, x = 0..10)
> g := x -> x^3;
> plot(g(f(x)), x = -10..10);

```

▼ Summen

```

> sum(j, j = 0..n);
> normal(%);
> sum(j^2, j = 0..n);
> normal(%)
> sum(q^j, j = 0..n);

```

```

> sum(1/j^2, j = 1..n);
> sum((-1)^(j+1)/j, j = 1..infinity)
> sum(q^n, n = 0..infinity);
> sum(4^n, n = 0..infinity);

```

$-\frac{1}{q-1}$

(8.1)

Grenzwerte

```

> a := (9*x^2-5)/(x-2)(x+3)
> limit(a, x = infinity);
> b := n! exp(n)/n^n sqrt(n);
> limit(b, n = infinity);

```

Integrale

```

> f := 1/(7+t^2)
> int(f, t);
> diff(%, t)
> simplify(%);
> int(exp(-x^2), x = -infinity..infinity);

```

Hilfe

```

> ? int
> ? EllipticF
> ? plot
> ? Catalan
>

```