

Handout for Sequences and Series

(by Svenja Lowitzsch)

Sequences:

```
> a:=n->1/(n^2);
```

$$a := n \rightarrow \frac{1}{n^2}$$

```
> a(1);
```

1

```
> seq(a(n),n=5..9);
```

$$\frac{1}{25} \frac{1}{36} \frac{1}{49} \frac{1}{64} \frac{1}{81}$$

Limit of a sequence:

```
> Limit(a(n),n=infinity); value(%);
```

$$\lim_{n \rightarrow \infty} \frac{1}{n^2}$$

0

Partial Sums:

```
> s:=n->Sum(a(j),j=1..n);
```

$$s := n \rightarrow \sum_{j=1}^n a(j)$$

```
> s(1); value(%);
```

$$\sum_{j=1}^1 \frac{1}{j^2}$$

1

```
> s(2); value(%);
```

$$\sum_{j=1}^2 \frac{1}{j^2}$$

$\frac{5}{4}$

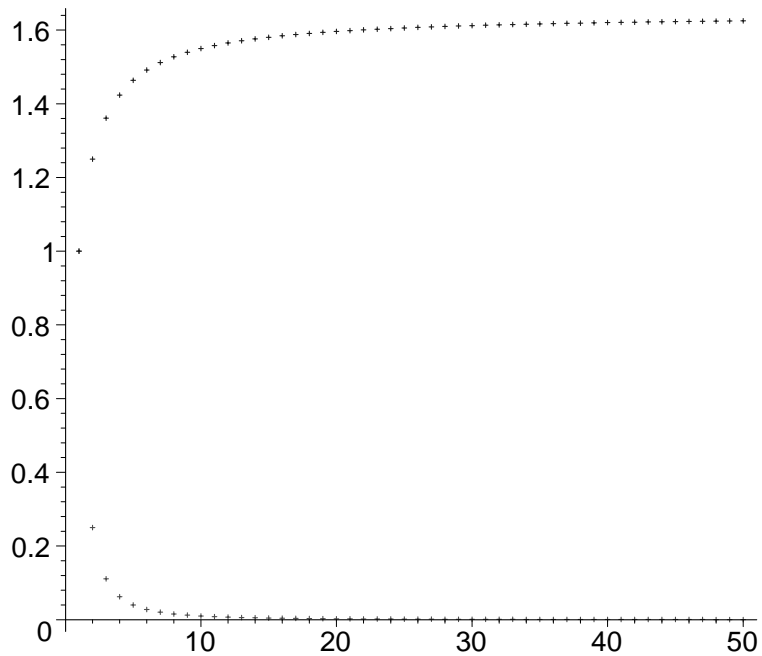
Infinite sum:

```
> Sum(a(j),j=1..infinity); value(%);
```

$$\sum_{j=1}^{\infty} \frac{1}{j^2}$$

$$\frac{1}{6}\pi^2$$

```
[ Simultaneous plot of sequence a_n with partial series s_n:  
[ > with(plots):  
[ > disp1:=seq([n,s(n)],n=1..50): disp2:=seq([n,a(n)],n=1..50):  
[ > plot1:=plot([disp1],style=point, colour=blue):  
[   plot2:=plot([disp2],style=point):  
[ > display([plot1,plot2]);
```



```
[ >
```