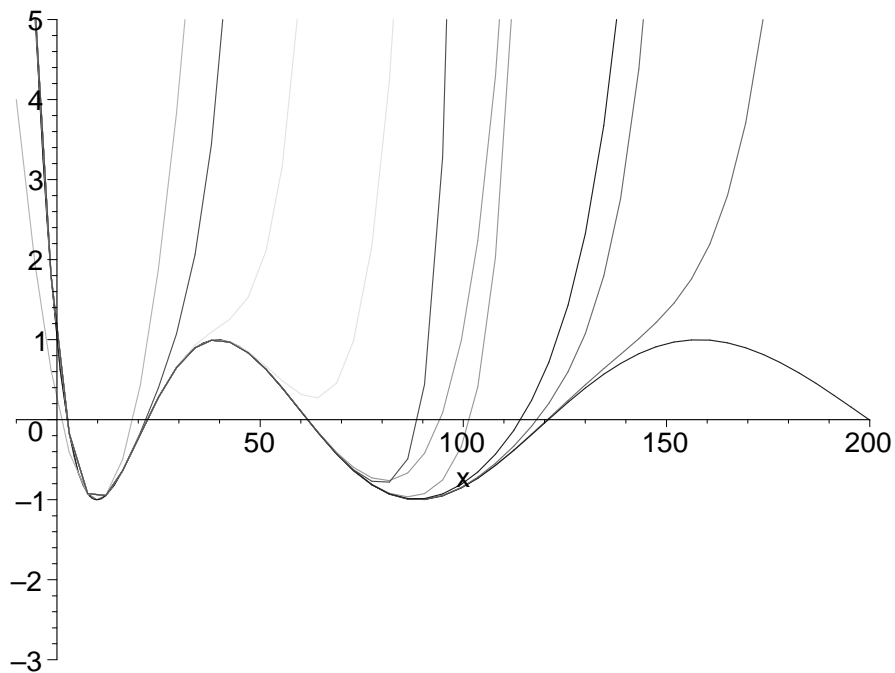


```

> p:=n->convert(taylor(cos(sqrt(x)),x=Pi^2,n+1),polynom);
      p := n → convert(taylor(cos(√x), x = π², n + 1), polynom)
> p(3);
      -1 +  $\frac{1}{8} \frac{(x - \pi^2)^2}{\pi^2} - \frac{1}{16} \frac{(x - \pi^2)^3}{\pi^4}$ 
> plot({cos(sqrt(x)),seq(p(2*n),n=1..10)},x=-10..200,-3..5);

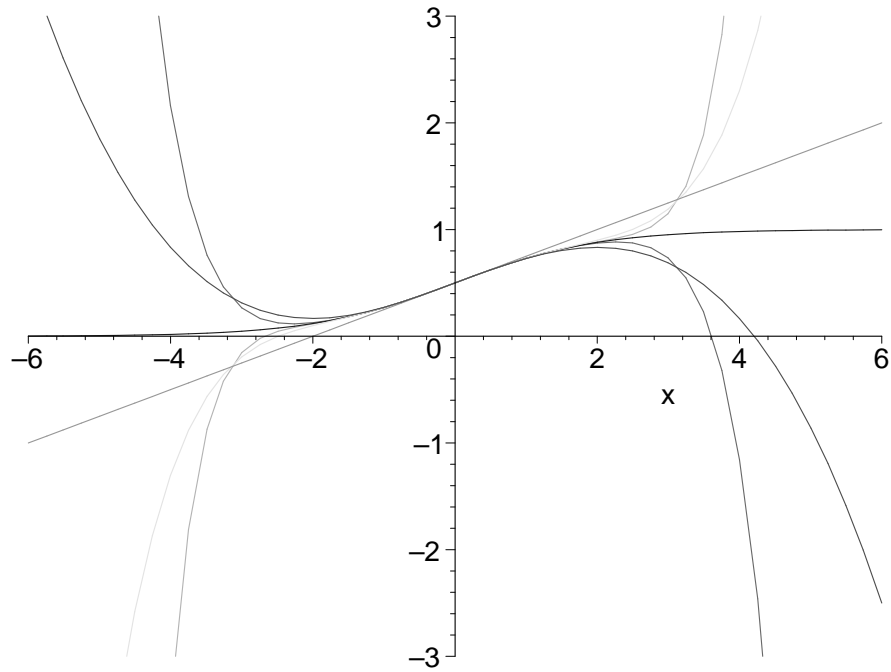
```



```

> f:=exp(x)/(exp(x)+1);
      f :=  $\frac{e^x}{e^x + 1}$ 
> p:=n->convert(taylor(f,x,n+1),polynom);
      p := n → convert(taylor(f, x, n + 1), polynom)
> plot({f,seq(p(n),n=1..10)},x=-6..6,-3..3);

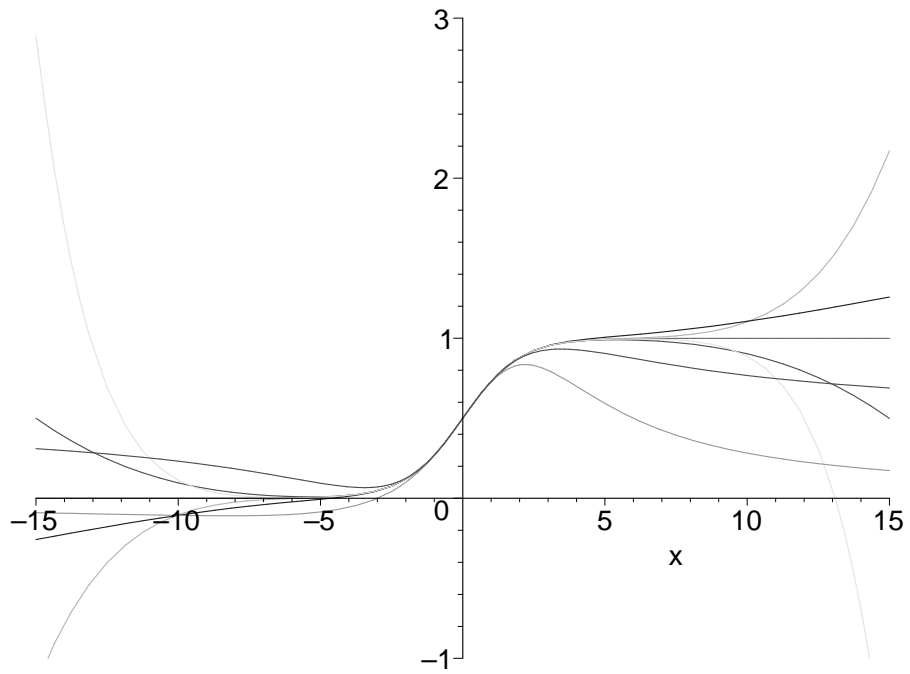
```



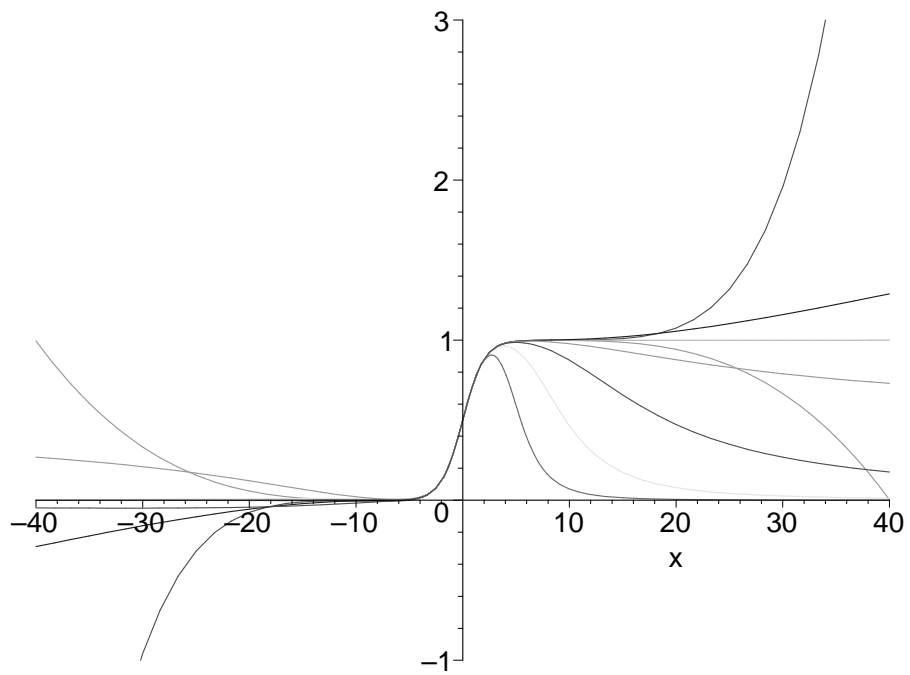
```
> pade := (m, n) -> convert(series(f, x, n+m+1), ratpoly, m, n);
      pade := (m, n) -> convert(series(f, x, n + m + 1), ratpoly, m, n)
> pade(2, 2);
```

$$\frac{\frac{1}{2} + \frac{1}{4}x + \frac{1}{24}x^2}{1 + \frac{1}{12}x^2}$$

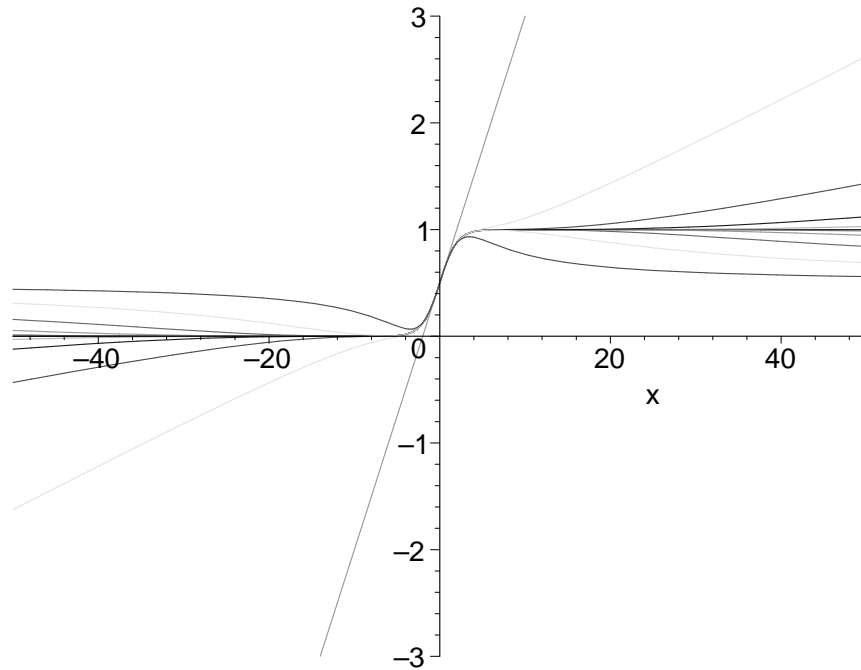
```
> plot({f, seq(pade(m, 2), m=1..10)}, x=-15..15, -1..3);
```



```
> plot({f, seq(pade(m, 4), m=1..10)}, x=-40..40, -1..3);
```



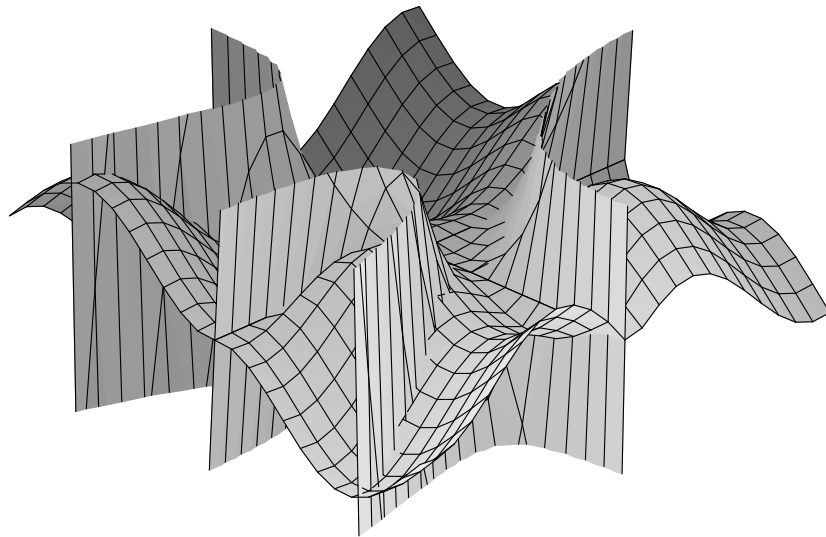
```
> plot({f, seq(pade(m, m), m=1..10)}, x=-50..50, -3..3);
```



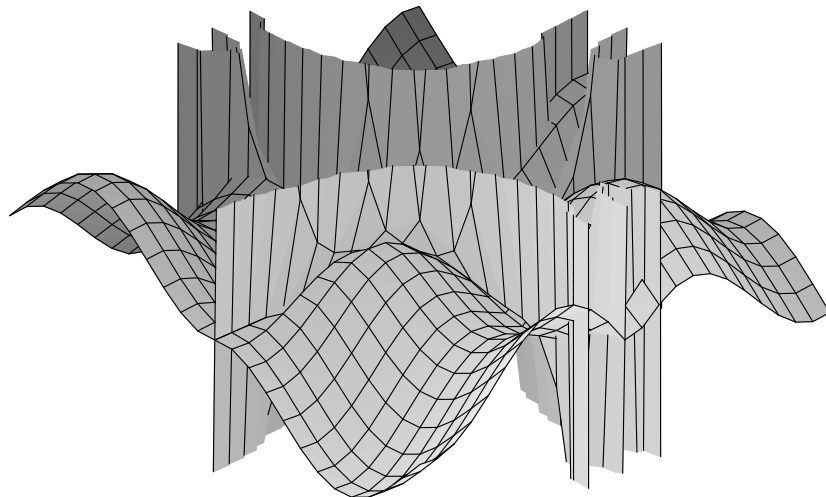
```

> f:=arctan(x*y)*(sin(x)+cos(y));
                                f:= arctan(x y) (sin(x) + cos(y))
> mt:=n->mtaylor(f,[x,y],n+1);
                                mt := n → mtaylor(f, [x, y], n + 1)
> mt(3);
                                x y + x2 y
> mt(4);
                                x y + x2 y - 1/2 x y3
> mt(7);
                                x y + x2 y - 1/2 x y3 - 1/6 x4 y + 1/24 x y5 - 1/3 x3 y3 + 1/120 x6 y - 1/3 x4 y3
> plot3d({f,mt(4)},x=-5..5,y=-5..5,view=-4..4);

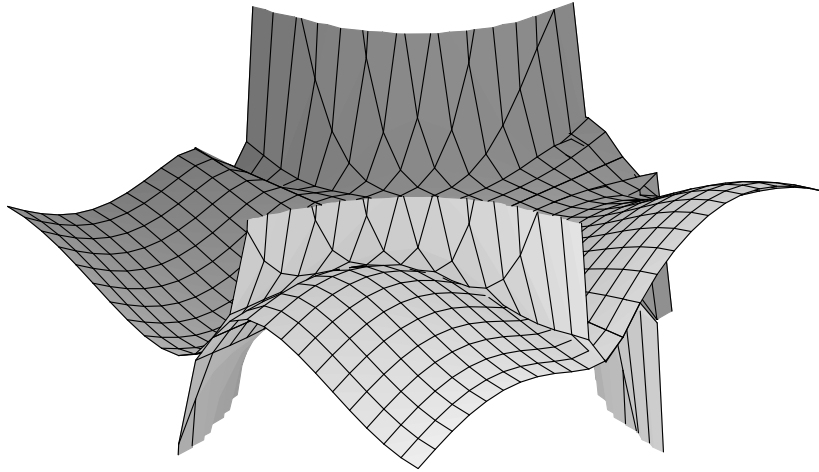
```



```
> plot3d({f,mt(10)},x=-5..5,y=-5..5,view=-4..4);
```



```
> plot3d({f,mt(10)},x=-3..3,y=-3..3,view=-4..4);
```



```
> f:=arcsin(x-y)/((3-2*x)*(1-2*y));
```

$$f := \frac{\arcsin(x-y)}{(3-2x)(1-2y)}$$

```
> mt:=n->mtaylor(f,[x=1,y=1],n+1);
```

$$mt := n \rightarrow \text{mtaylor}(f, [x=1, y=1], n+1)$$

```
> mt(4);
```

$$-x+y-2(x-1)^2+4(x-1)(y-1)-2(y-1)^2-\frac{25}{6}(x-1)^3+\frac{17}{2}(x-1)^2(y-1)$$

$$-\frac{17}{2}(x-1)(y-1)^2+\frac{25}{6}(y-1)^3-\frac{25}{3}(x-1)^4+\frac{52}{3}(y-1)(x-1)^3-18(y-1)^2(x-1)^2$$

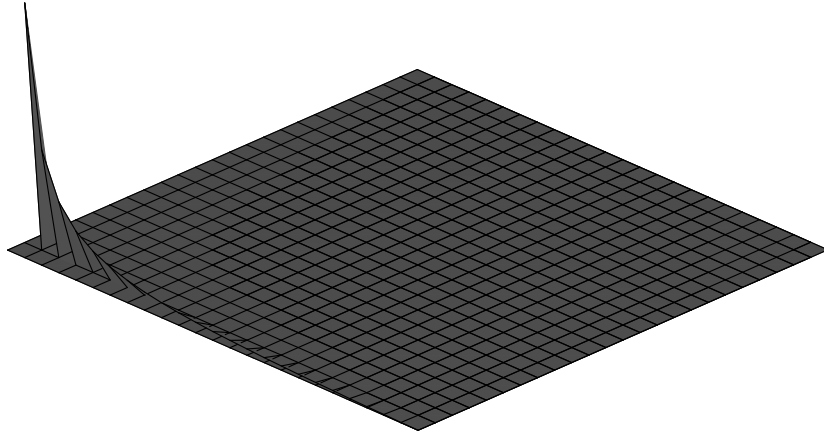
$$+\frac{52}{3}(y-1)^3(x-1)-\frac{25}{3}(y-1)^4$$

```
> simplify(%);
```

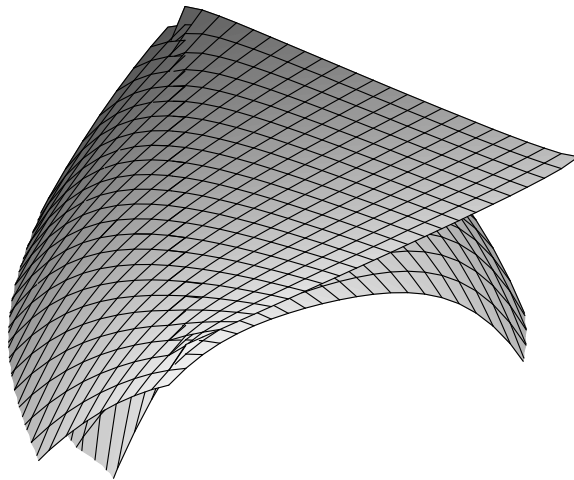
$$-14x^2-22y^2-\frac{15}{2}x^2y-\frac{49}{2}xy^2+\frac{71}{6}x^3+\frac{121}{6}y^3-\frac{25}{3}x^4-\frac{25}{3}y^4+\frac{52}{3}x^3y-18x^2y^2+\frac{52}{3}xy^3$$

$$+36xy-5x+5y$$

```
> plot3d({f,mt(4)},x=1/2..3/2,y=1/2..3/2);
```



```
> plot3d({f,mt(4)},x=1/2+0.01..3/2,y=1/2..3/2,view=-1..1);
```

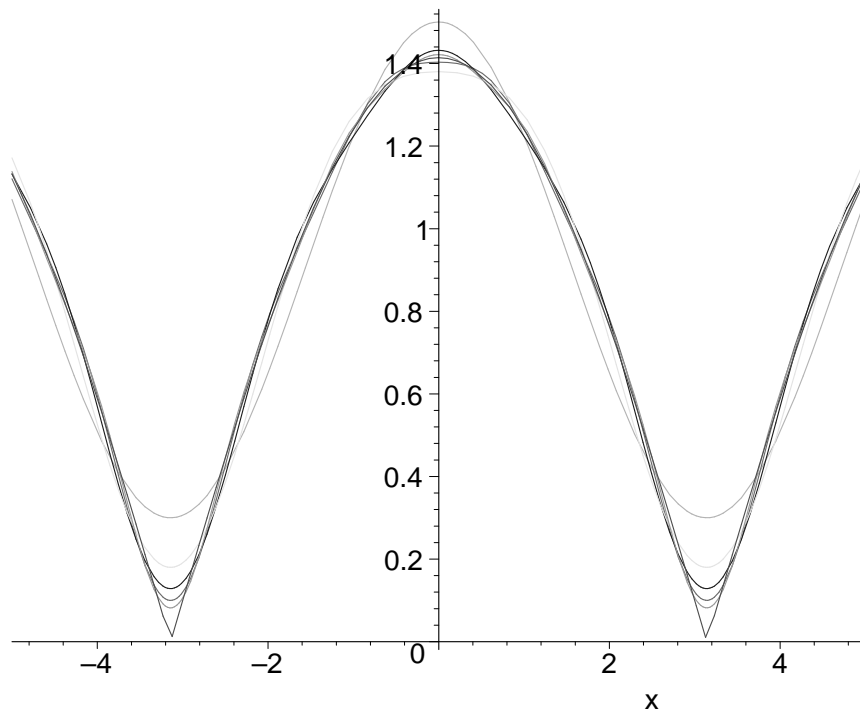


```
> f:=sqrt(1+cos(x));
```

```

[
> a:=k->int(f*cos(k*x),x=-Pi..Pi)/Pi;
      f:=sqrt(1+cos(x))
      a := k -> \frac{\int_{-\pi}^{\pi} f \cos(k x) dx}{\pi}
> b:=k->int(f*sin(k*x),x=-Pi..Pi)/Pi;
      b := k -> \frac{\int_{-\pi}^{\pi} f \sin(k x) dx}{\pi}
> fourier:=n->a(0)/2+sum(a(k)*cos(k*x)+b(k)*sin(k*x),k=1..n);
      fourier := n -> \frac{1}{2} a(0) + \left( \sum_{k=1}^n (a(k) \cos(k x) + b(k) \sin(k x)) \right)
> fourier(5);
      2 \frac{\sqrt{2}}{\pi} + \frac{4}{3} \frac{\sqrt{2} \cos(x)}{\pi} - \frac{4}{15} \frac{\sqrt{2} \cos(2 x)}{\pi} + \frac{4}{35} \frac{\sqrt{2} \cos(3 x)}{\pi} - \frac{4}{63} \frac{\sqrt{2} \cos(4 x)}{\pi} + \frac{4}{99} \frac{\sqrt{2} \cos(5 x)}{\pi}
> plot({f,seq(fourier(n),n=1..5)},x=-5..5);

```



```

[
> f:=arcsin(x/Pi);
      f := arcsin\left(\frac{x}{\pi}\right)

```



```

> a:=k->evalf(Int(f*cos(k*x),x=-Pi..Pi)/Pi);

```

$$a := k \rightarrow \text{evalf}\left(\frac{\int_{-\pi}^{\pi} f \cos(kx) dx}{\pi}\right)$$

```

> b:=k->evalf(Int(f*sin(k*x),x=-Pi..Pi)/Pi);

```

$$b := k \rightarrow \text{evalf}\left(\frac{\int_{-\pi}^{\pi} f \sin(kx) dx}{\pi}\right)$$

```

> fourier:=n->a(0)/2+sum(a(k)*cos(k*x)+b(k)*sin(k*x),k=1..n);

```

$$fourier := n \rightarrow \frac{1}{2} a(0) + \left( \sum_{k=1}^n (a(k) \cos(kx) + b(k) \sin(kx)) \right)$$

```

> fourier(3);

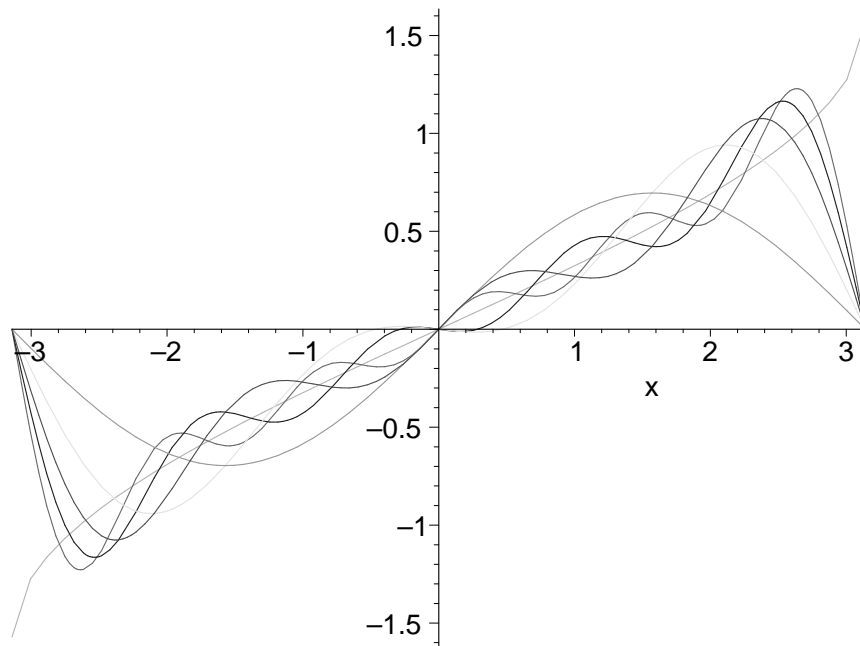
```

$$.6957578220 \sin(x) - .3898615453 \sin(2. x) + .2729295153 \sin(3. x)$$

```

> plot({f,seq(fourier(n),n=1..5)},x=-Pi..Pi);

```



```

>

```