Паде - аппроксимация: 1.3.6 [0/n]

Реализация функции:

```
padeApprox[func_, n_Integer] := Module[
  {taylor = Series[1 / func, {x, 0, n}],
   approx},
  approx = (Normal@taylor)^-1;
  Plot[{func, approx}, {x, -Pi, Pi},
   AspectRatio → Automatic, Filling → Axis, PlotLegends → {func, approx}]
 ]
```

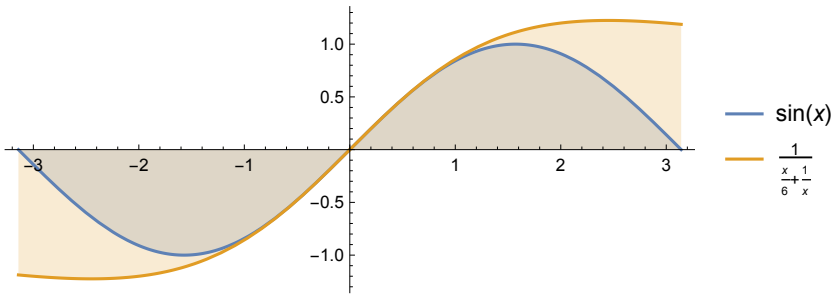
Результат работы алгоритма :

Пример 1

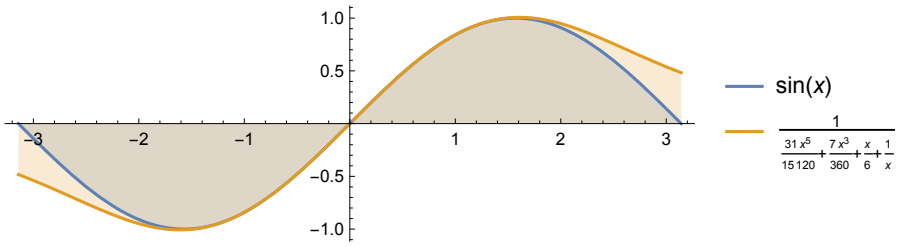
```
func = Sin[x];
```

```
Do[Print["n=", n]; Print[padeApprox[Sin[x], n]], {n, 1, 15, 5}]
```

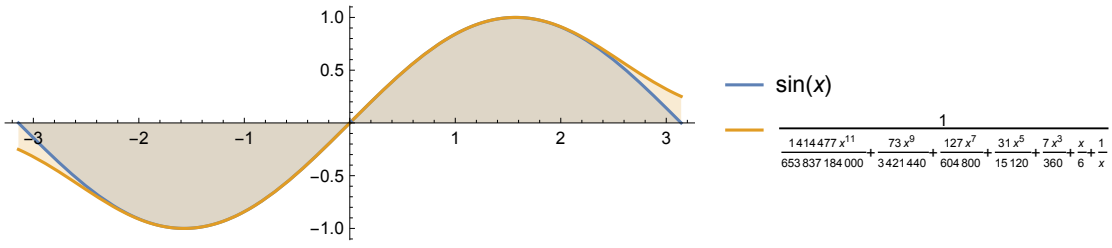
n=1



n=6



n=11

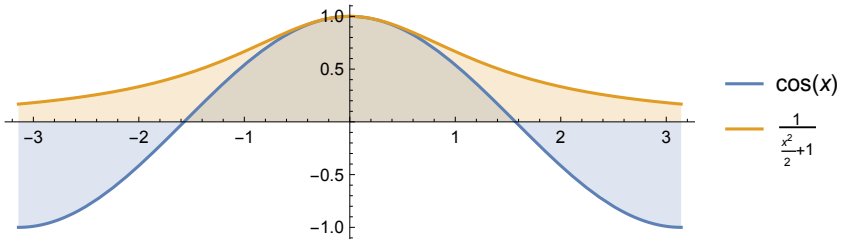


Пример 2

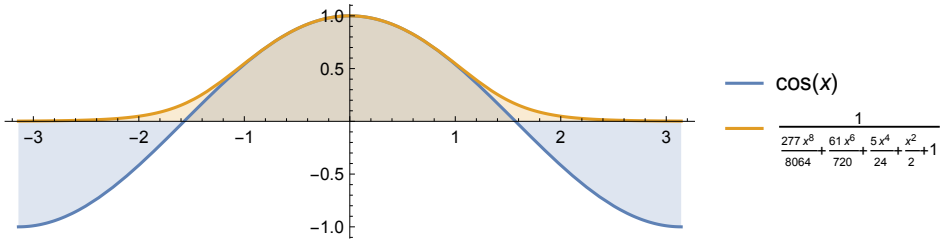
```
func = Cos[x];
```

```
Do[Print["n=", n]; Print[padeApprox[Cos[x], n]], {n, 3, 15, 5}]
```

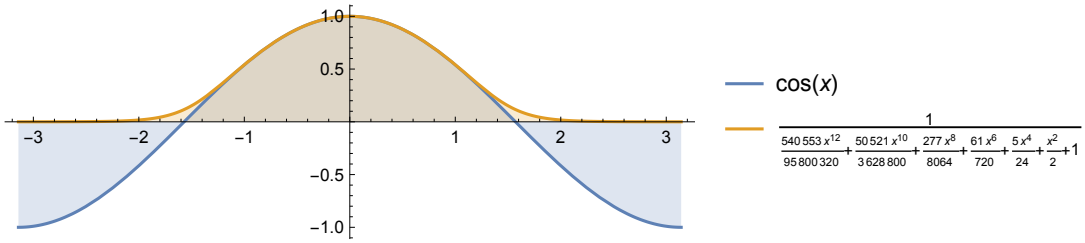
n=3



n=8



n=13

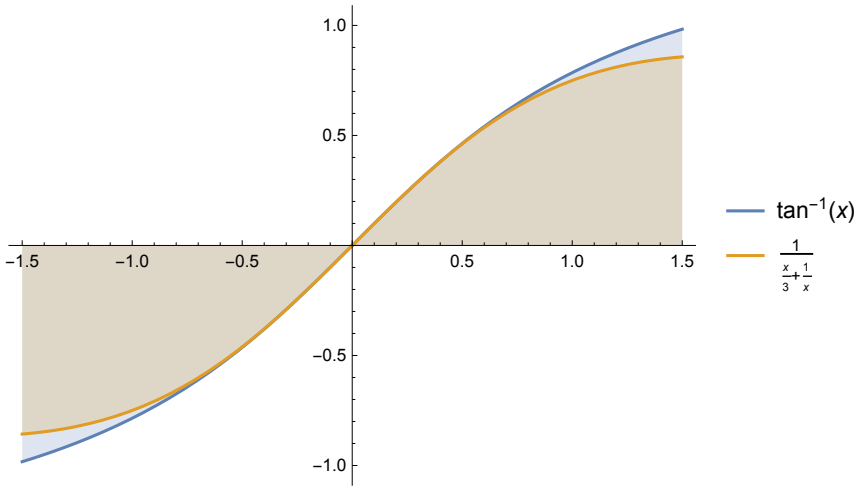


Пример 3

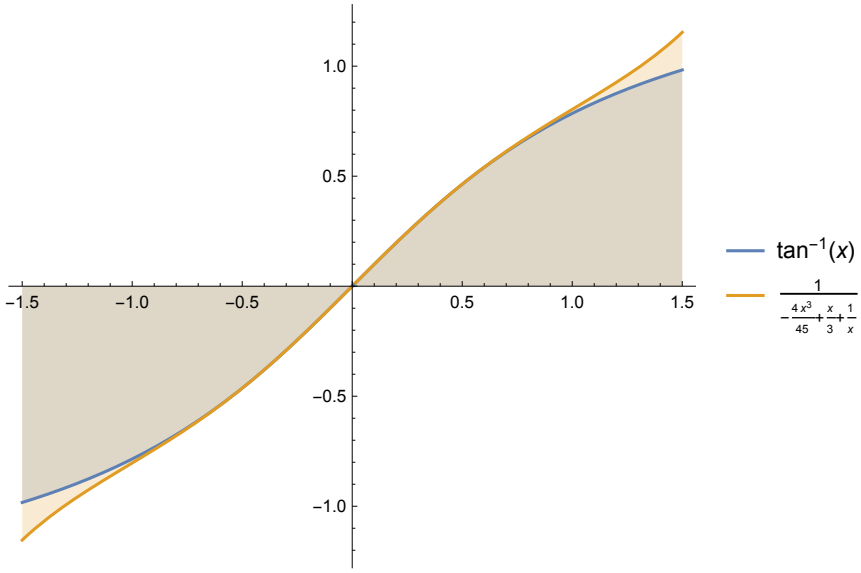
```
func = ArcTan[x];
```

```
Do[Print["n=", n]; Print[padeApprox[ArcTan[x], n]], {n, 1, 9, 3}]
```

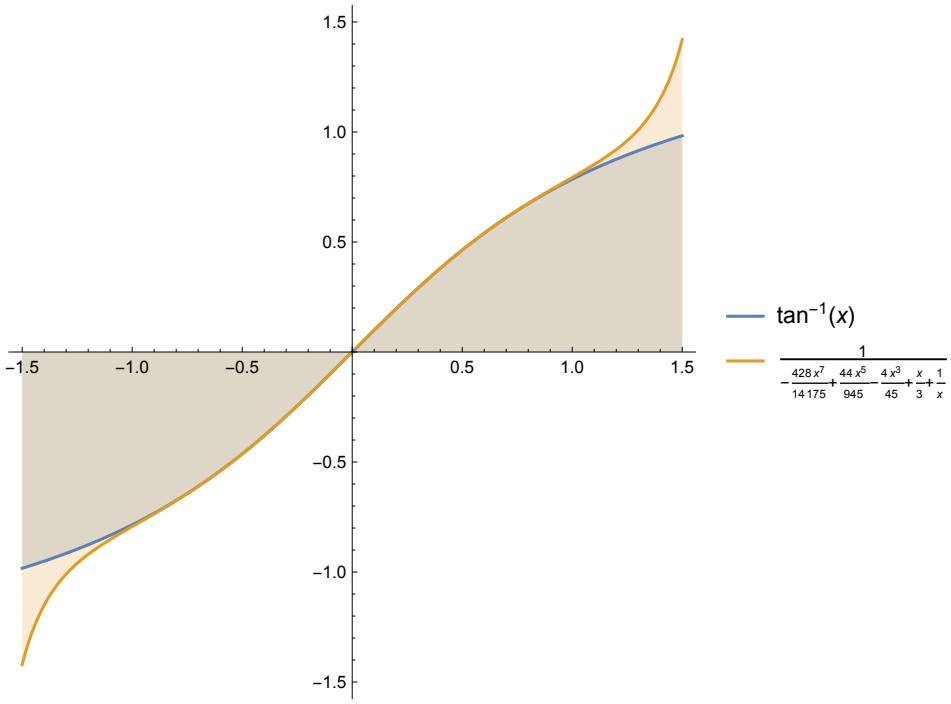
n=1


1.0
0.5
−1.5
−1.0
−0.5
0.5
1.0
1.5
−0.5
−1.0
tan⁻¹(x)
1/(x/3 + 1/x)

n=4


1.0
0.5
−1.5
−1.0
−0.5
0.5
1.0
1.5
−0.5
−1.0
tan⁻¹(x)
1/(−4x³/45 + x/3 + 1/x)

n=7

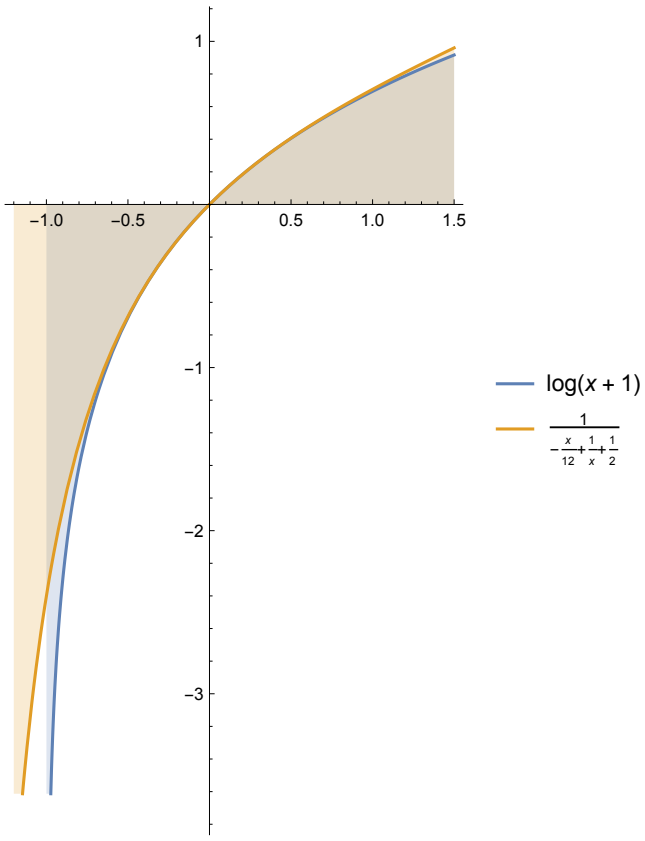


Пример 4

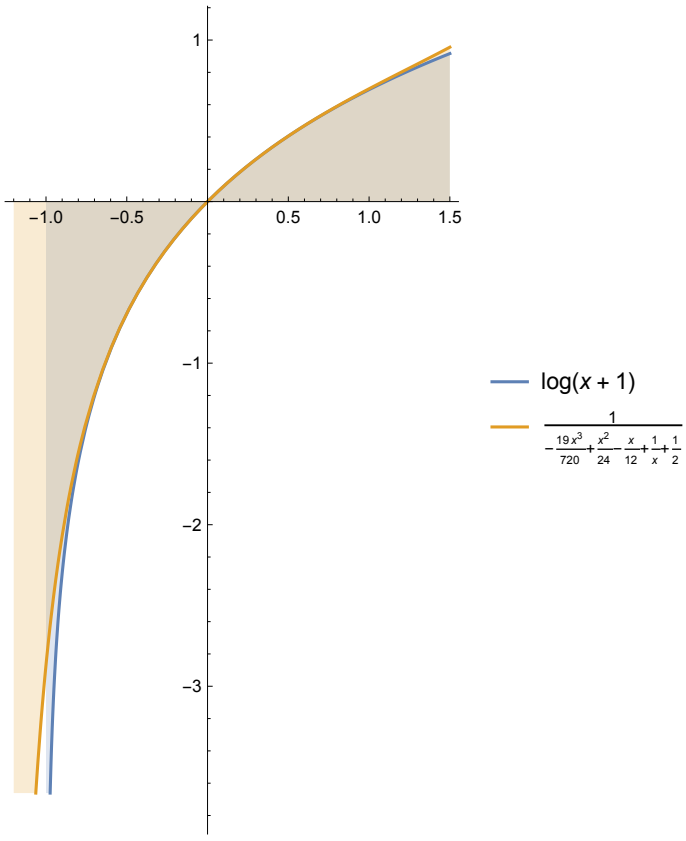
```
func = Log[x];
```

```
Do[Print["n=", n]; Print[padeApprox[Log[x + 1], n]], {n, 1, 5, 2}]
```

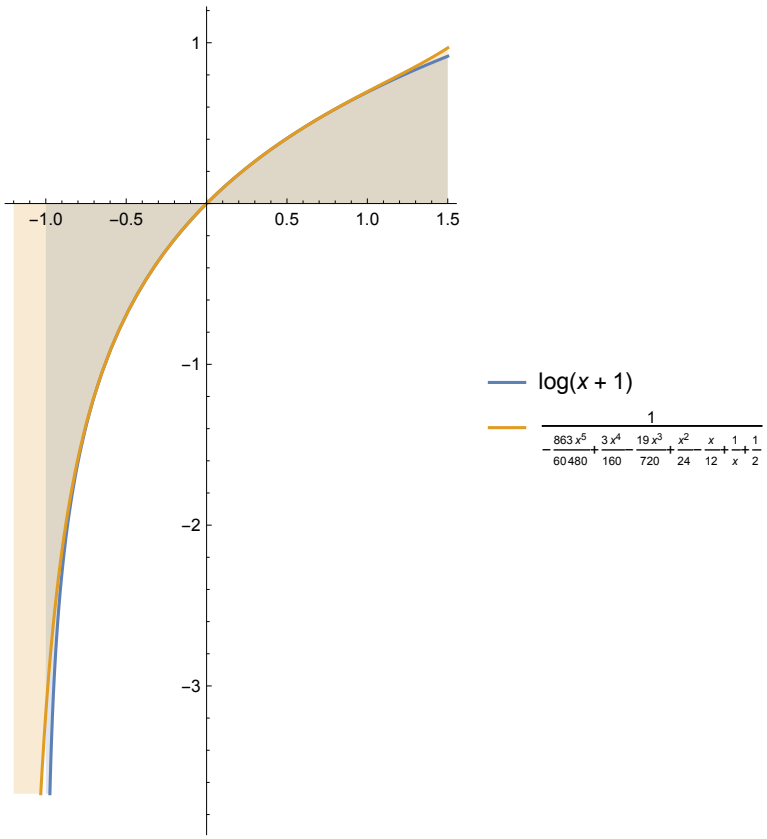
```
n=1
```


1
−1.0
−0.5
0.5
1.0
1.5
−1
−2
−3
log(x + 1)
1
−x/12 + 1/x + 1/2

n=3


1
−1.0
−0.5
0.5
1.0
1.5
−1
−2
−3
log(x + 1)
1
−19x^3/720 + x^2/24 − x/12 + 1/x + 1/2

n=5


1
−1.0
−0.5
0.5
1.0
1.5
−1
−2
−3
log(x + 1)
1
−863 x^5/60480 + 3 x^4/160 − 19 x^3/720 + x^2/24 − x/12 + 1/x + 1/2