In [1]:

```
import numpy
from sympy import *
```

In [2]:

```
def chebyshev_interpolation(polynomial, a, b):
    x = Symbol('x')
    n = degree(polynomial, gen=x)
    polynomial = polynomial - LC(polynomial)*(b - a)**n/2**(2*n-1)*chebyshevt(n,
(2*x+a+b)/(b-a))
    return polynomial
```

In [3]:

```
def telescoping_method(function, a, b, n_taylor, deg):
    x = Symbol('x')
    polynomial = series(function, x, x0=0, n=n_taylor+1).removeO()
    for _ in range(n_taylor-deg):
        polynomial = chebyshev_interpolation(polynomial, a, b)
    return polynomial
```

In [4]:

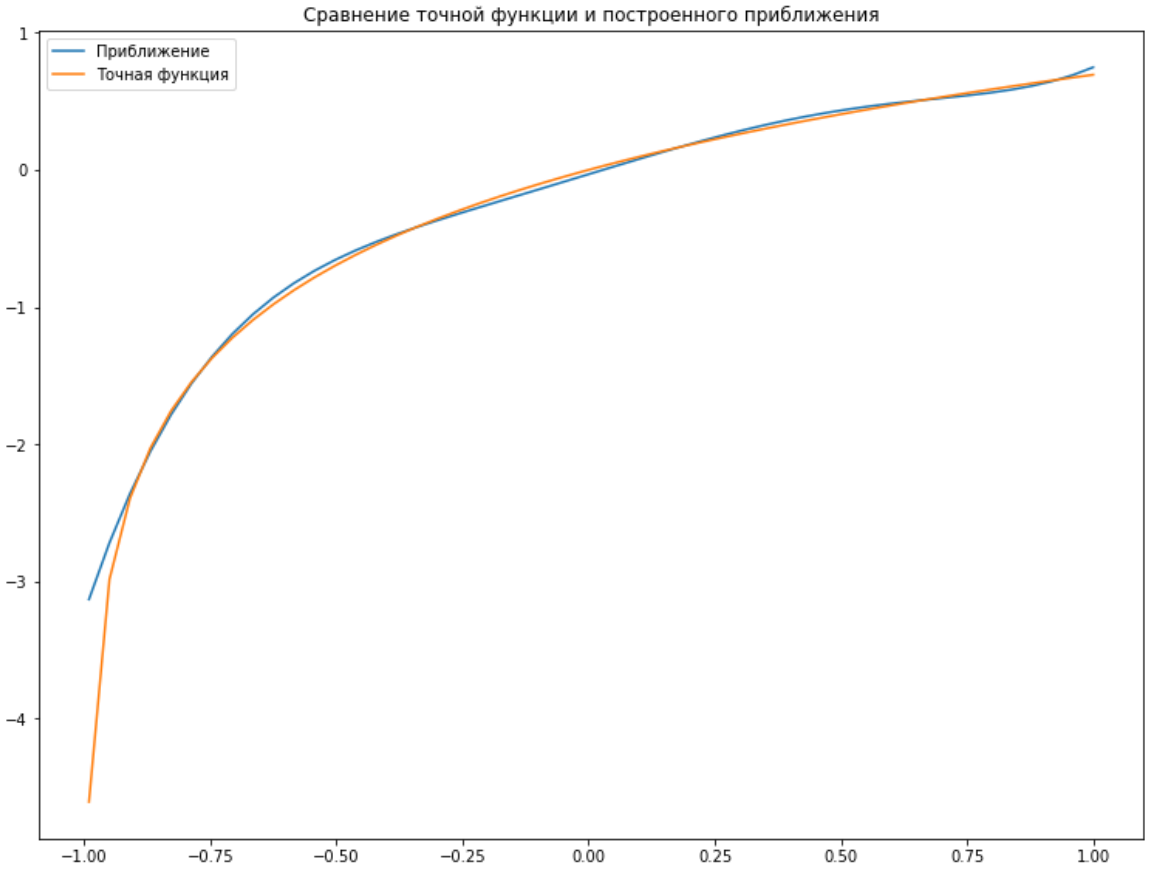
```
x = Symbol('x')
function = ln(1+x)
a = -1
b = 1
n_taylor = 15
deg = 5
telescope = telescoping_method(function, a, b, n_taylor, deg)
telescope
```

Out[4]:

$$\frac{1377x^5}{1024} - \frac{309x^4}{256} - \frac{2881x^3}{6144} - \frac{61x^2}{8192} + \frac{18325x}{16384} - \frac{55091}{1720320}$$

In [5]:

```
import matplotlib.pyplot as plt
import numpy as np
space = np.linspace(-0.99, 1)
plt.figure(figsize=(12.8, 9.6))
plt.title('Сравнение точной функции и построенного приближения')
plt.plot(space, lambdify(x, telescope, 'numpy')(space), label='Приближение')
plt.plot(space, lambdify(x, ln(1+x), 'numpy')(space), label='Точная функция')
plt.legend()
plt.show()
```




In [ ]: