

# Метод Чебышева 2.1.8

Подготовил Ерофеевский Александр ПМ-1801

Дано: функция  $f(x)$ , начальное приближение  $x_0$ , количество итераций  $k$

```
In[ ]:= Needs["NumericalCalculus`"]
```

```
In[ ]:= ClearAll@chebyshevsMethod
```

```
chebyshevsMethod[f_, x0_, k_] := Module[  
  {x = x0},  
  Do[  
    
$$x = x - \frac{f[x]}{ND[f[s], s, x]} - \frac{f[x]^2 * ND[f[s], \{s, 2\}, x]}{2 * (ND[f[s], s, x])^3},$$
  
    {i, 1, k}];  
  x]
```

Результаты

Пример 1

```
In[ ]:= Clear@f
```

```
f[x_] := x3 - 4 x2 + 10 x - 10
```

```
x0 = 1;
```

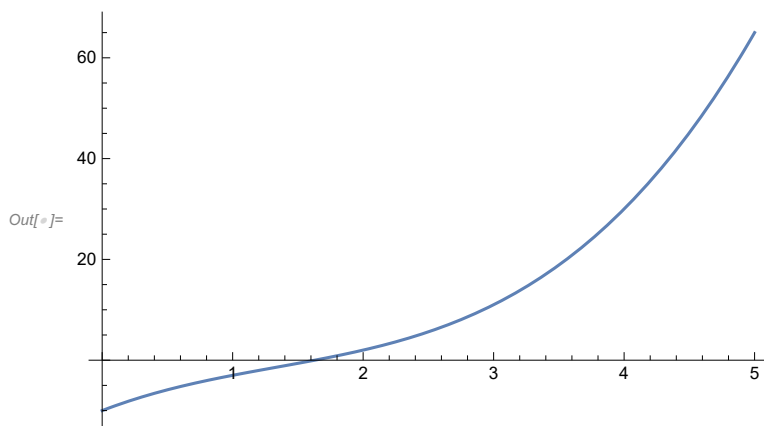
```
k = 10;
```

```
In[ ]:= chebyshevsMethod[f, x0, k]
```

```
Out[ ]:= 1.62936
```

Проверка

```
In[ ]:= Plot[f[x], {x, 0, 5}]
```



```
In[ ]:= N[Solve[f[x] == 0]]
```

```
Out[ ]:= {{x -> 1.62936}, {x -> 1.18532 + 2.17541 i}, {x -> 1.18532 - 2.17541 i}}
```

Пример 2

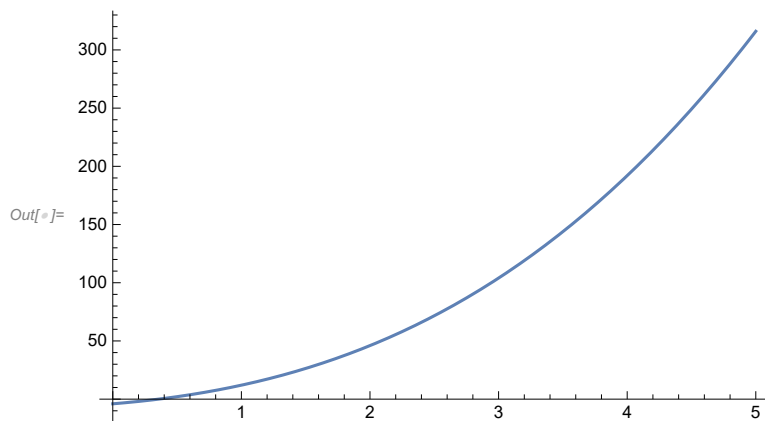
```
In[ ]:= Clear@f
      f[x_] := x3 + 6 x2 + 9 x - 4
      x0 = 1;
      k = 10;
```

```
In[ ]:= chebyshevsMethod[f, x0, k]
```

```
Out[ ]:= 0.355301
```

Проверка

```
In[ ]:= Plot[f[x], {x, 0, 5}]
```



```
In[ ]:= N[Solve[f[x] == 0]]
```

```
Out[ ]:= {{x -> 0.355301}, {x -> -3.17765 + 1.0773 I}, {x -> -3.17765 - 1.0773 I}}
```