Kirill Zakharov
Chebyshev interpolation

```
chebyshev[fun_, x0_, m_, a_] := Module[{x = x0, array = {x0}, iter, der1, der2},
  der1 = N@D[fun[y], y] /. y → x;
  der2 = N@D[fun[y], {y, 2}] /. y → x;
  Do[
   If[Abs@fun[x] < a, Break[],
    x = x - fun[x]/der1 - (fun[x])^2 der2/(2 der1^3); AppendTo[array, x]]; iter = i,
   {i, 1, m}];
  {x, iter}]
```

Test 1

```
fun[x_] := e^x - 5
```

```
chebyshev[fun, 2, 10, 0.0001]
```

```
{1.60945, 7}
```

```
Log[5] // N
```

```
1.60944
```

Test 2

```
fun1[x_] := x^3 + 6 x^2 + 9 x - 4
```

```
chebyshev[fun1, 1, 10, 0.001]
```

```
{0.355358, 9}
```

```
Solve[x^3 + 6 x^2 + 9 x - 4 == 0, x]
```

```
{{x → 0.355...}, {x → -3.18... - 1.08... i}, {x → -3.18... + 1.08... i}}
```