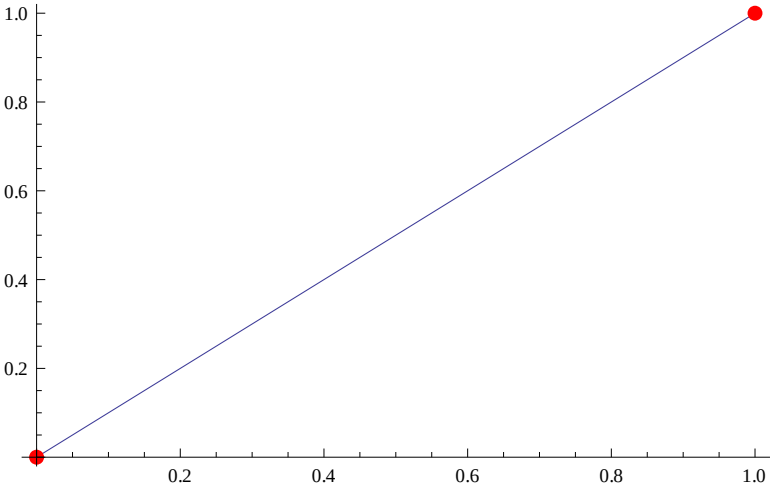
```
Exit[];

Punkte = {0, 1}; n = Length[Punkte];
x[i_] := 1 / (n - 1) * (i - 1)
L[i_, y_] := Product[(y - x[j]) / (x [i] - x[j]), {j, i - 1}] *
  Product[(y - x[j]) / (x [i] - x[j]), {j, i + 1, n}]
Show[Plot[Sum[L[i, y] * Punkte[[i]], {i, n}], {y, 0, 1}],
 ListPlot[Table[{x[i], Punkte[[i]]}, {i, n}],
  PlotStyle → Directive[PointSize[Large], Red]]]
```




```
L[1, y]
L[2, y]
```

$1 - y$

y

```
h = {1, y, y ^ 2, y ^ 3}
```

$\{1, y, y^2, y^3\}$

```
co = Inverse[{{1, 0, 1, 0}, {-1, 1, 1, 1}, {1, -2, 1, 2}, {-1, 3, 1, 3}}]; c // MatrixForm
```

c

```
co.h
```

$$\left\{\frac{1}{2} - \frac{3\,y}{4} + \frac{y^3}{4},\ \frac{1}{4} - \frac{y}{4} - \frac{y^2}{4} + \frac{y^3}{4},\ \frac{1}{2} + \frac{3\,y}{4} - \frac{y^3}{4},\ -\frac{1}{4} - \frac{y}{4} + \frac{y^2}{4} + \frac{y^3}{4}\right\}$$

```
co[[1]]
```

$$\left\{\frac{1}{2}, -\frac{3}{4}, 0, \frac{1}{4}\right\}$$

```
H[i_, y_] := Sum[y ^ (j - 1) * c[[i, j]], {j, 4}]
```

```
H[1, y]
```

$$\frac{1}{2} - \frac{3\,y}{4} + \frac{y^3}{4}$$

```
tt
```

```
g[x_] := Select[tt, Abs[x - #[[1]]] < 2 / nN &]
```

```
f[x0_, tt0_, nN0_, co0_] := Module[{x = x0, y, h, tt = tt0, nN = nN0, co = co0},
  S = Select[tt, x == #[[1]] &];
  If[Length[S] ≠ 0,
   S[[1, 2]],
   S = Select[tt, Abs[x - #[[1]]] < 2 / nN &];
   h = {1, y, y^2, y^3} /. y -> (x - #[[2, 1]]) / (#[[3, 1]] - #[[2, 1]]) &[S];
   {#[[2, 2]], (#[[3, 2]] - #[[1, 2]]) / 2, #[[3, 2]], (#[[4, 2]] - #[[2, 2]]) / 2}.co.h &[
    S]]]
```

```
f[0, tt, nN, co]
```

```
-0.016
```

```
Select[tt, 0.020052287581699347 == #[[1]] &]
```

```
{{0.0200523, -0.00906009}}
```

```
tt[[2]]
```

```
{0.0200523, -0.00906009}
```

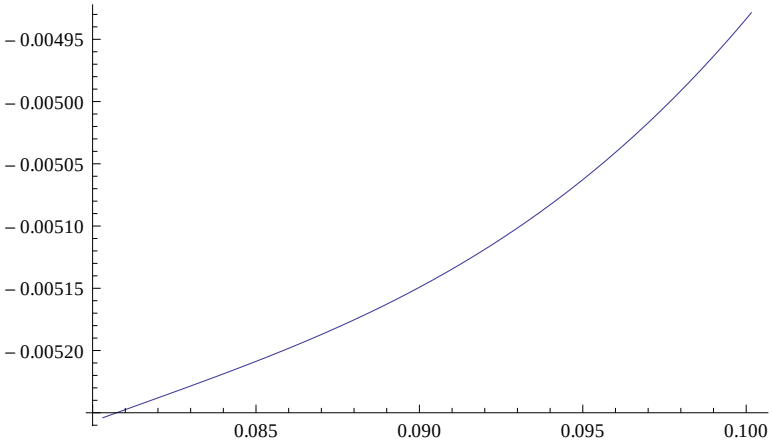
```
g[0.5]
```

```
{{0.461203, 0.000329567}, {0.481255, 0.000469316},
 {0.501307, 0.00059029}, {0.521359, 0.00072094}}
```

```
tt[[
```

```
ii = 5; Plot[f[tr, tt, nN, co], {tr, tt[[ii, 1]], tt[[ii + 1, 1]]}]
```

```
Part::partw :
  Part 4 of {{0.0601569, -0.00644924}, {≪1≫}, {0.100261, -0.00492535}} does not exist. ≫
```



```
Sum[H[i, y] * Punkte[[i]], {i, 4}]
```

$$\frac{1}{2} - \frac{3\,y}{4} + \frac{y^3}{4} + 2\left(\frac{1}{4} - \frac{y}{4} - \frac{y^2}{4} + \frac{y^3}{4}\right)$$

```
Punkte = {1, -10, 1, 10};
Show[Plot[Sum[H[i, y] * Punkte[[i]], {i, 4}], {y, -1, 1}],
  ListPlot[Table[{2 * i - 3, Punkte[[2 * i - 1]]}, {i, 2}],
    PlotStyle → Directive[PointSize[Large], Red]]]
```