a) Sprungantwort des realen angepassten 380 kV Kabels nach dem numerischen Talbot-Verfahren

b) Ausschnittsvergrößerung

c) Rechteckimpuls auf dem realen angepassten Kabel nach dem numerischen Talbot-Verfahren

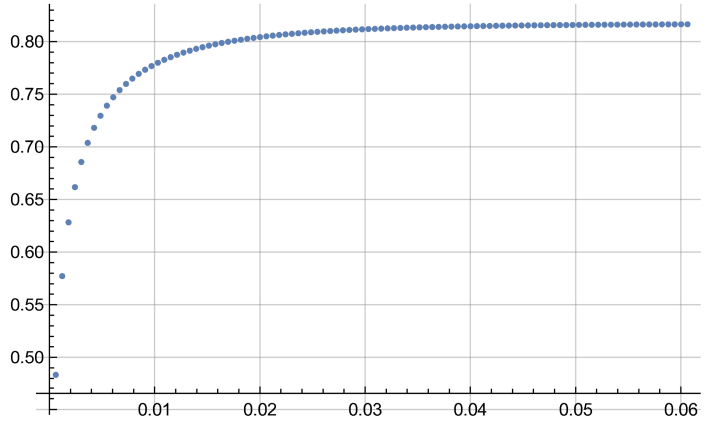
jeweils der Graph mit den Lösungspunkten und der Graph als kubischer Spline

```
In[ ]:= U = 380*^3;
P = 2929*^6;
Z0 = 239;
Z1 = 0.01;
l = 1000;
x = 1000;
Cs = 245.9*^-12;
Rs = 27.3*^-6;
Ls = 0.5981*^-6;
tandelta = 0.001;
tr = 1*^-7;
Gs = 1 / (1 / (2 * Pi * 50 * Cs) * tandelta);
                  Kreiszahl π
Z2 = U^2 / P;
td = x * Sqrt[Ls * Cs];
        Quadratwurzel
Talbot[Fs_, t_, N1_] := Module[{h, shift, ans, theta, k, z, dz},
                          Modul
  h = 2 * Pi / N1;
       Kreiszahl π
  shift = 0;
  ans = 0;
  For[k = 0, k <= N1, k++,
  For-Schleife
```

```
  theta = -Pi + (k + 1 / 2) * h;
  z = shift + N1 / t * (0.5017 * theta * Cot[0.6407 * theta] - 0.6122 + 0.2645 * I * theta);
  dz = N1 / t * (-0.5017 * 0.6407 * theta / Sin[0.6407 * theta]^2 + 0.5017 * Cot[0.6407 * theta] + 0.2645 * I);
  ans = ans + Exp[z * t] * Fs[z] * dz;];
 Re[h / (2 * I * Pi) * ans]]
```

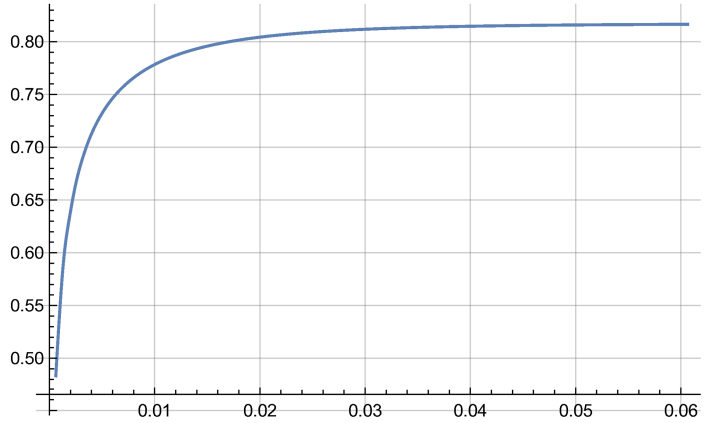
```
lap[p_] := 1 / p * (Z2 * Cosh[Sqrt[(Rs + p * Ls) * (Gs + p * Cs)] * (l - x)] + Z0 * Sinh[Sqrt[(Rs + p * Ls) * (Gs + p * Cs)] * (l - x)]) /
     ((Z1 + Z2) * Cosh[Sqrt[(Rs + p * Ls) * (Gs + p * Cs)] * l] + (Z0 + Z1 * Z2 / Z0) * Sinh[Sqrt[(Rs + p * Ls) * (Gs + p * Cs)] * l]);
M = 100; Talits = 150; Zeit = 5000 * td;
Liste = Table[{Zeit / M * i, Talbot[lap, Zeit / M * i, Talits]}, {i, 1, M}];
ListPlot[Liste, PlotRange → All, GridLines → Automatic]
```

Out[ ]=



In[ ]:=
```
ListLinePlot[Liste, InterpolationOrder → 3, PlotRange → All, GridLines → Automatic]
```
listenbezogene Liniengra··· | Ordnung der Interpolation | Koordinatenb··· | alle | Gitternetzlinien | automatisch

Out[ ]=



In[•]:=
```
M = 800; Talits = 150; Zeit = 2 * td;
Liste = Table[{Zeit / M * i, Talbot[lap, Zeit / M * i, Talits]}, {i, 1, M}];
        Tabelle
ListPlot[Liste, PlotRange → All, GridLines → Automatic]
          listenbezogene Gr···  Koordinatenb···  alle  Gitternetzlinien  automatisch
```

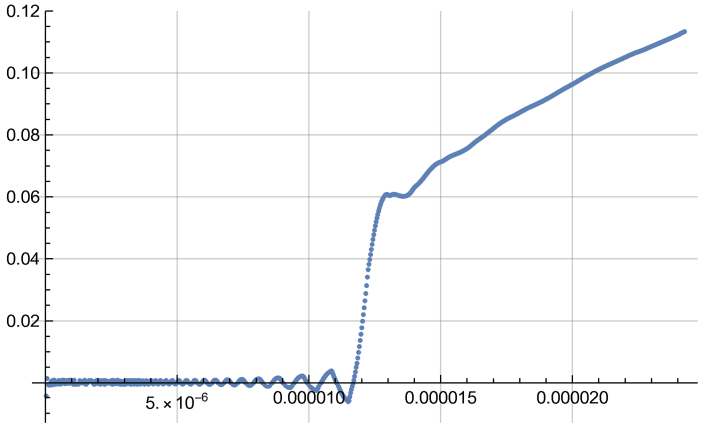
--- General: $(49.3001 + 0.\,i)\,(-9.72013531286691 \times 10^{-313} + 2.990577134920595 \times 10^{-312}\,i)$ is too small to represent as a normalized machine number; precision may be lost.

--- General: $(49.3001 + 0.\,i)\,(-9.72013531286691 \times 10^{-313} - 2.990577134920595 \times 10^{-312}\,i)$ is too small to represent as a normalized machine number; precision may be lost.

--- General: $\frac{1}{8.67754 \times 10^{301} + 4.39825 \times 10^{305}\,i}$ is too small to represent as a normalized machine number; precision may be lost.

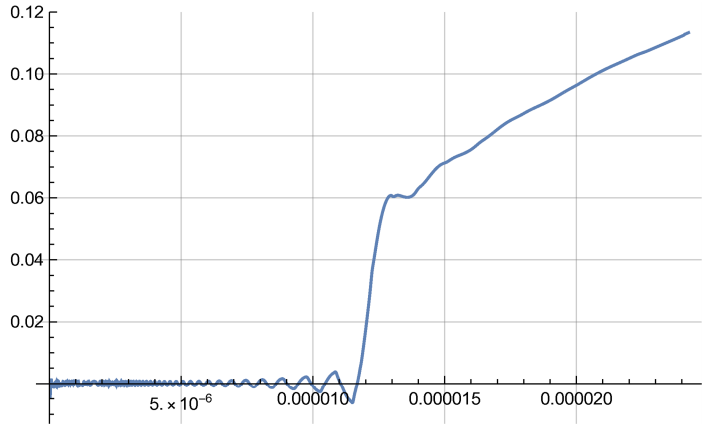
--- General: Further output of General::munfl will be suppressed during this calculation.

Out[•]=



In[ ]:=
```
ListLinePlot[Liste, InterpolationOrder → 3, PlotRange → All, GridLines → Automatic]
```
listenbezogene Liniengra··· | Ordnung der Interpolation | Koordinatenb··· | alle | Gitternetzlinien | automatisch

Out[ ]=



In[ ]:=
```
lap[p_] := 1 / p * (1 - Exp[-tr * p]) *
```
Exponentialfunktion
```
  (Z2 * Cosh[Sqrt[(Rs + p * Ls) * (Gs + p * Cs)] * (l - x)] + Z0 * Sinh[Sqrt[(Rs + p * Ls) * (Gs + p * Cs)] * (l - x)]) /
```
Kos··· | Quadratwurzel | Sinu·· | Quadratwurzel
```
   ((Z1 + Z2) * Cosh[Sqrt[(Rs + p * Ls) * (Gs + p * Cs)] * l] + (Z0 + Z1 * Z2 / Z0) * Sinh[Sqrt[(Rs + p * Ls) * (Gs + p * Cs)] * l]);
```
Kos··· | Quadratwurzel | Sinu·· | Quadratwurzel
```
M = 800; Talits = 150; Zeit = 2.5 * td;
Liste = Table[{Zeit / M * i, Talbot[lap, Zeit / M * i, Talits]}, {i, 1, M}];
```
Tabelle
```
ListPlot[Liste, PlotRange → All, GridLines → Automatic]
```
listenbezogene Gr··· | Koordinatenb··· | alle | Gitternetzlinien | automatisch
```
ListLinePlot[Liste, InterpolationOrder → 3, PlotRange → All, GridLines → Automatic]
```
listenbezogene Liniengra··· | Ordnung der Interpolation | Koordinatenb··· | alle | Gitternetzlinien | automatisch

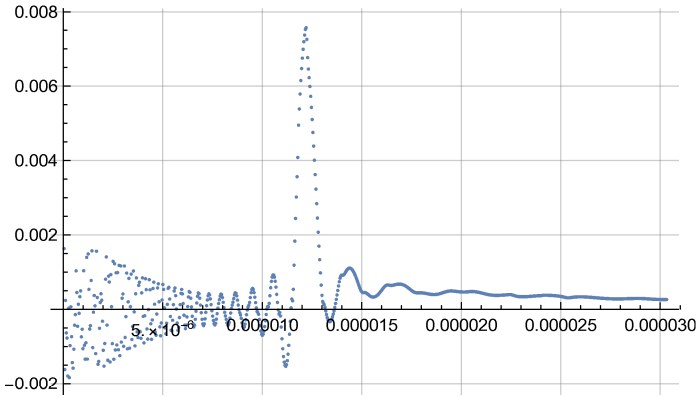
--- General: $(49.3001 + 0.\,i)\,(-1.030801414997517 \times 10^{-313} + 4.07656447811966 \times 10^{-314}\,i)$ is too small to represent as a normalized machine number; precision may be lost.

--- General: $(49.3001 + 0.\,i)\,(-1.030801414997517 \times 10^{-313} - 4.07656447811966 \times 10^{-314}\,i)$ is too small to represent as a normalized machine number; precision may be lost.

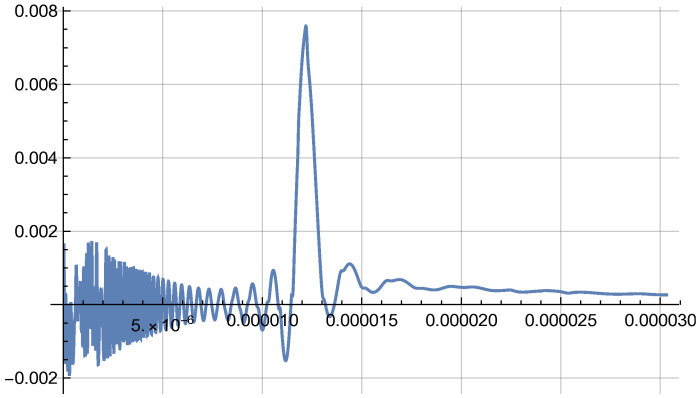
--- General: $(1.37943 \times 10^{-9} + 4.65234 \times 10^{-9}\,i)\,(1.1347 \times 10^{-307} - 1.06407 \times 10^{-307}\,i)$ is too small to represent as a normalized machine number; precision may be lost.

--- General: Further output of General::munfl will be suppressed during this calculation.

Out[ ]=


0.008
0.006
0.004
0.002
−0.002
5. × 10⁻⁶
0.000010
0.000015
0.000020
0.000025
0.000030

Out[ ]=


0.008
0.006
0.004
0.002
−0.002
5. × 10⁻⁶
0.000010
0.000015
0.000020
0.000025
0.000030