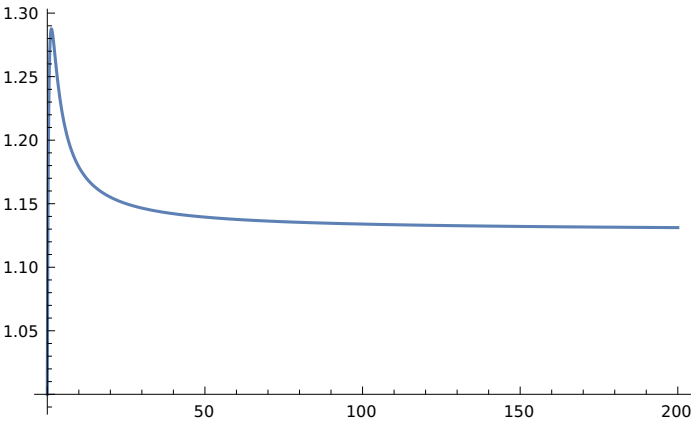
In[1]:=
```
(* Reference :M.M.Shepherd and J.G.Laframboise Mathematics of Computation ,
v36, p249 (1981) *)
```

In[2]:=
```
g[x_] := (1 + 2 x) Exp[x ^ 2] Erfc[x]
```

In[3]:=
```
Plot[g[x], {x, 0, 200}, PlotRange → All, WorkingPrecision → 20]
```

Out[3]=



In[4]:=
```
k0 = 15 / 4;
F[t_] := g[k0 (1 + t) / (1 - t)]
m = 30;
t = Table[Cos[(2 k + 1) / (m + 1) Pi / 2], {k, 0, m}];
j = 0;
c0 = Sum[F[t[[k + 1]]] ChebyshevT [j , t[[k + 1]]], {k, 0, m}] / (m + 1);
c0 = N[c0, 22]
c = Table[Sum[F[t[[k + 1]]] ChebyshevT [j , t[[k + 1]]], {k, 0, m}] / (m + 1) 2, {j , 1, m}];
c = N[c, 22];
c // MatrixForm
```

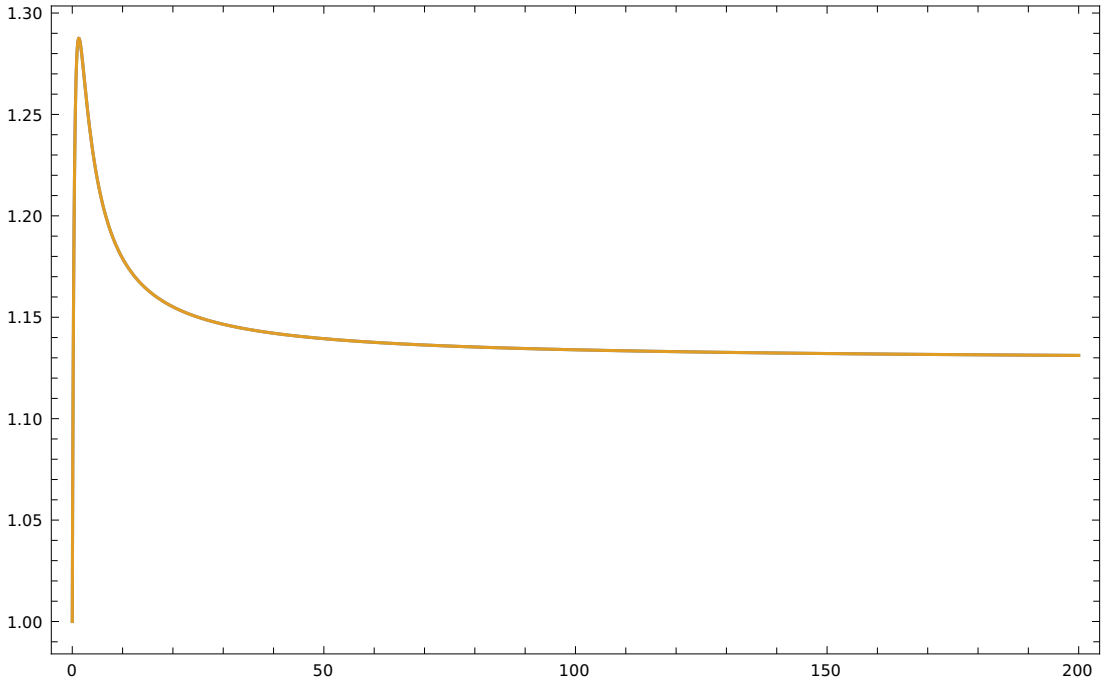
Out[10]= 1.177578934567401754080

Out[13]//MatrixForm=

$$\begin{pmatrix}
-0.00459005458064647733085 3 \\
-0.08424913336651791558351 \\
0.05920993999819189049808 \\
-0.02665866843530575227739 \\
0.00907499767070526509387 9 \\
-0.00241316354041760819094 3 \\
0.00049077583652580863228 59 \\
-0.00006916973302501206367096 \\
4.139027986073010167534 \times 10^{-6} \\
7.740383066198490668633 \times 10^{-7} \\
-2.188640104923439566149 \times 10^{-7} \\
1.076499946567091037714 \times 10^{-8} \\
4.521959811218286897931 \times 10^{-9} \\
-7.754400208831351106474 \times 10^{-10} \\
-6.318088340886684494391 \times 10^{-11} \\
2.868795010930669898123 \times 10^{-11} \\
1.945586854577734728858 \times 10^{-13} \\
-9.654696748433438857610 \times 10^{-13} \\
3.252548148148739958341 \times 10^{-14} \\
3.347811948286797208130 \times 10^{-14} \\
-1.864562880419518235323 \times 10^{-15} \\
-1.250795053067845637214 \times 10^{-15} \\
7.418235257215452126907 \times 10^{-17} \\
5.068148904140930511821 \times 10^{-17} \\
-2.237056783345205320267 \times 10^{-18} \\
-2.187343059565471422412 \times 10^{-18} \\
2.676850384178821259586 \times 10^{-20} \\
9.737174416403160998127 \times 10^{-20} \\
3.288513138865842600404 \times 10^{-21} \\
-4.467230367603372705258 \times 10^{-21}
\end{pmatrix}$$

In[14]:=
```
Plot[
 {g[x], c0 ChebyshevT[0, (x - k0)/(x + k0)] + Sum[c[[i]] ChebyshevT[i, (x - k0)/(x + k0)], {i, 1, m}]},
 {x, 0, 200}, WorkingPrecision → 20, PlotRange → All, Frame → True]
```

Out[14]=



In[15]:=
```
Plot[
 {c0 ChebyshevT[0, (x - k0)/(x + k0)] + Sum[c[[i]] ChebyshevT[i, (x - k0)/(x + k0)], {i, 1, m}] - g[x]},
 {x, 0, 200}, WorkingPrecision → 20, PlotRange → All, Frame → True]
```

Out[15]=