```
> # Set the parameters and functions
  c :='c':
  d :='d':
  u :='u':
  J := (10*c+40)*u^8+(10*c^2+200*c-10*d^3)*u^7+(5*c^5+280*c^2-10*d^3)*u^6+(102*c^5+50*c^4
       -15*d^7-51*d^6-280*d^3)*u^5+(9*c^8+56*c^7+216*c^6-142*d^5-1400*d^4)*u^4+(68*c^8+122*c^7
       -9*d^9-866*d^6-1960*d^5)*u^3+(15*c^10+11*c^9-56*d^8-1166*d^7-1400*d^6)*u^2+(55*c^10
       -54*d^9-602*d^8-520*d^7)*u-100*d^9-80*d^8:
  print(Output);
  # find Sturm's sequence``
   for j from 0 by 1 to 19 do
  c := 4+(j+1)/20*(4108/1000-4):
  d := 4+j/20*(4108/1000-4):
  u :='u':
  S := sturmseq(J, u);
  signnum := sturm(S, u, 4, 6);
   with(ArrayTools):
   Slength := Size(S, 2);
  X := Array(1..Slength);
  Y := Array(1..Slength);

     for i from 1 to Slength do
   # Find sgn [s_J'_i(4)]
       u := 4;
       X[i] := signum(S[i]);
   # Find sgn [s_J'_i(6)]
       u := 6:
       Y[i] := signum(S[i]);
     end do;
   # show the final results
    print(['a'[j],'a'[j+1], sgn(s['J'[j]](0)), sgn(s['J'[j]](6))] = [evalf(d, 5), evalf(c, 5), X, Y]) ;
  end do:
```

Output

$$\left[a_0, a_1, sgn\left(s_{J_0}(0)\right), sgn\left(s_{J_0}(6)\right)\right] = [4., 4.0054, [-1\ -1\ 1\ -1\ -1\ 1\ 1\ 1\ -1], [-1\ -1\ 1\ -1\ -1\ -1\ 1\ 1\ -1]]$$

$$\left[a_1, a_2, sgn\left(s_{J_1}(0)\right), sgn\left(s_{J_1}(6)\right)\right] = [4.0054, 4.0108, [-1\ -1\ 1\ -1\ -1\ 1\ 1\ 1\ -1], [-1\ -1\ 1\ -1\ -1\ -1\ 1\ 1\ -1]]$$

$$\left[a_2, a_3, sgn\left(s_{J_2}(0)\right), sgn\left(s_{J_2}(6)\right)\right] = [4.0108, 4.0162, [-1\ -1\ 1\ -1\ -1\ 1\ 1\ 1\ -1], [-1\ -1\ 1\ -1\ -1\ -1\ 1\ 1\ -1]]$$

$$\left[a_3, a_4, sgn\left(s_{J_3}(0)\right), sgn\left(s_{J_3}(6)\right)\right] = [4.0162, 4.0216, [-1\ -1\ 1\ -1\ -1\ 1\ 1\ 1\ -1], [-1\ -1\ 1\ -1\ -1\ -1\ 1\ 1\ -1]]$$

$$\left[a_4, a_5, sgn\left(s_{J_4}(0)\right), sgn\left(s_{J_4}(6)\right)\right] = [4.0216, 4.0270, [-1\ -1\ 1\ -1\ -1\ 1\ 1\ 1\ -1], [-1\ -1\ 1\ -1\ -1\ -1\ 1\ 1\ -1]]$$

$$\left[a_5, a_6, sgn\left(s_{J_5}(0)\right), sgn\left(s_{J_5}(6)\right)\right] = [4.0270, 4.0324, [-1\ -1\ 1\ -1\ -1\ 1\ 1\ 1\ -1], [-1\ -1\ 1\ -1\ -1\ -1\ 1\ 1\ -1]]$$

$$\left[a_6, a_7, sgn\left(s_{J_6}(0)\right), sgn\left(s_{J_6}(6)\right)\right] = [4.0324, 4.0378, [-1\ -1\ 1\ -1\ -1\ 1\ 1\ 1\ -1], [-1\ -1\ 1\ -1\ -1\ -1\ 1\ 1\ -1]]$$

$$\left[a_7, a_8, sgn\left(s_{J_7}(0)\right), sgn\left(s_{J_7}(6)\right)\right] = \left[4.0378, 4.0432, \left[\begin{matrix}-1 & -1 & 1 & -1 & -1 & 1 & 1 & 1 & -1\end{matrix}\right], \left[\begin{matrix}-1 & -1 & 1 & -1 & -1 & -1 & 1 & 1 & -1\end{matrix}\right]\right]$$

$$\left[a_8, a_9, sgn\left(s_{J_8}(0)\right), sgn\left(s_{J_8}(6)\right)\right] = \left[4.0432, 4.0486, \left[\begin{matrix}-1 & -1 & 1 & -1 & -1 & 1 & 1 & 1 & -1\end{matrix}\right], \left[\begin{matrix}-1 & -1 & 1 & -1 & -1 & -1 & 1 & 1 & -1\end{matrix}\right]\right]$$

$$\left[a_9, a_{10}, sgn\left(s_{J_9}(0)\right), sgn\left(s_{J_9}(6)\right)\right] = \left[4.0486, 4.0540, \left[\begin{matrix}-1 & -1 & 1 & -1 & -1 & 1 & 1 & 1 & -1\end{matrix}\right], \left[\begin{matrix}-1 & -1 & 1 & -1 & -1 & -1 & 1 & 1 & -1\end{matrix}\right]\right]$$

$$\left[a_{10}, a_{11}, sgn\left(s_{J_{10}}(0)\right), sgn\left(s_{J_{10}}(6)\right)\right] = \left[4.0540, 4.0594, \left[\begin{matrix}-1 & -1 & 1 & -1 & -1 & 1 & 1 & 1 & -1\end{matrix}\right], \left[\begin{matrix}-1 & -1 & 1 & -1 & -1 & -1 & 1 & 1 & -1\end{matrix}\right]\right]$$

$$\left[a_{11}, a_{12}, sgn\left(s_{J_{11}}(0)\right), sgn\left(s_{J_{11}}(6)\right)\right] = \left[4.0594, 4.0648, \left[\begin{matrix}-1 & -1 & 1 & -1 & -1 & 1 & 1 & 1 & -1\end{matrix}\right], \left[\begin{matrix}-1 & -1 & 1 & -1 & -1 & -1 & 1 & 1 & -1\end{matrix}\right]\right]$$

$$\left[a_{12}, a_{13}, sgn\left(s_{J_{12}}(0)\right), sgn\left(s_{J_{12}}(6)\right)\right] = \left[4.0648, 4.0702, \left[\begin{matrix}-1 & -1 & 1 & -1 & -1 & 1 & 1 & 1 & -1\end{matrix}\right], \left[\begin{matrix}-1 & -1 & 1 & -1 & -1 & -1 & 1 & 1 & -1\end{matrix}\right]\right]$$

$$\left[a_{13}, a_{14}, sgn\left(s_{J_{13}}(0)\right), sgn\left(s_{J_{13}}(6)\right)\right] = \left[4.0702, 4.0756, \left[\begin{matrix}-1 & -1 & 1 & -1 & -1 & 1 & 1 & 1 & -1\end{matrix}\right], \left[\begin{matrix}-1 & -1 & 1 & -1 & -1 & -1 & 1 & 1 & -1\end{matrix}\right]\right]$$

$$\left[a_{14}, a_{15}, sgn\left(s_{J_{14}}(0)\right), sgn\left(s_{J_{14}}(6)\right)\right] = \left[4.0756, 4.0810, \left[\begin{matrix}-1 & -1 & 1 & -1 & -1 & 1 & 1 & 1 & -1\end{matrix}\right], \left[\begin{matrix}-1 & -1 & 1 & -1 & -1 & -1 & 1 & 1 & -1\end{matrix}\right]\right]$$

$$\left[a_{15}, a_{16}, sgn\left(s_{J_{15}}(0)\right), sgn\left(s_{J_{15}}(6)\right)\right] = \left[4.0810, 4.0864, \left[\begin{matrix}-1 & -1 & 1 & -1 & -1 & 1 & 1 & 1 & -1\end{matrix}\right], \left[\begin{matrix}-1 & -1 & 1 & -1 & -1 & -1 & 1 & 1 & -1\end{matrix}\right]\right]$$

$$\left[a_{16}, a_{17}, sgn\left(s_{J_{16}}(0)\right), sgn\left(s_{J_{16}}(6)\right)\right] = \left[4.0864, 4.0918, \left[\begin{matrix}-1 & -1 & 1 & -1 & -1 & 1 & 1 & 1 & -1\end{matrix}\right], \left[\begin{matrix}-1 & -1 & 1 & -1 & -1 & -1 & 1 & 1 & -1\end{matrix}\right]\right]$$

$$\left[a_{17}, a_{18}, sgn\left(s_{J_{17}}(0)\right), sgn\left(s_{J_{17}}(6)\right)\right] = \left[4.0918, 4.0972, \left[\begin{matrix}-1 & -1 & 1 & -1 & -1 & 1 & 1 & 1 & -1\end{matrix}\right], \left[\begin{matrix}-1 & -1 & 1 & -1 & -1 & -1 & 1 & 1 & -1\end{matrix}\right]\right]$$

$$\left[a_{18}, a_{19}, sgn\left(s_{J_{18}}(0)\right), sgn\left(s_{J_{18}}(6)\right)\right] = \left[4.0972, 4.1026, \left[\begin{matrix}-1 & -1 & 1 & -1 & -1 & 1 & 1 & 1 & -1\end{matrix}\right], \left[\begin{matrix}-1 & -1 & 1 & -1 & -1 & -1 & 1 & 1 & -1\end{matrix}\right]\right]$$

$$\left[a_{19}, a_{20}, sgn\left(s_{J_{19}}(0)\right), sgn\left(s_{J_{19}}(6)\right)\right] = \left[4.1026, 4.1080, \left[\begin{matrix}-1 & -1 & 1 & -1 & -1 & 1 & 1 & 1 & -1\end{matrix}\right], \left[\begin{matrix}-1 & -1 & 1 & -1 & -1 & -1 & 1 & 1 & -1\end{matrix}\right]\right] \quad \textbf{(1)}$$

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