Shape Interrogation for CAD/CAM

Note: These codes were tested on the <u>**32-bit**</u> Linux boxes with GNU's C/C++ (gcc/g++)

(1) Example 5.6.1 and Example 5.6.2 of the Hyperbook:

Use ./solpow.cc, which is a program to illustrate the Interval Projected Polyhedron nonlinear system solver (w/ input as power basis polynomial equations)

Input file format:
  number of equations (N), number of variables
  degree list for equation 1
  coefficients for equation 1
  ....
  degree list for equation N
  coefficients for equation N

How to make:
  prompt> make

How to run:
  Example 5.6.1:
  prompt> ex.5.6 ex.5.6.1.in
  Example 5.6.2:
  prompt> ex.5.6 ex.5.6.2.in

  Note for "Example 5.6.2":
      In order to use the IPP solver, we need a re-parameterization such that:
      x = 4t - 2, y = 2s -1 where $0 \le s, t \le 1$, and need to re-formulate the given equations
      f and g to get the corresponding coefficients data (as shown in ex.5.6.2.in).

      We also note that a lot of root boxes are generated during solution process due to
      the tangential intersection at (s, t) = (0.5, 1) i.e. (x, y) = (2, 0).
      Such root boxes are merged and consolidated as one root through the root
      consolidation process.

      Also note you will need to substitute the resulting roots in (s, t) into:
      x = 4t - 2 and y = 2s -1 to have the roots in (x, y) as mentioned above.

(2) Example 5.9 of the Hyperbook (in pp. 155 - 156 of the hardcopy edition):

Use ./solbern.cc, which is a program to illustrate the Interval Projected Polyhedron nonlinear system solver (w/ input as Bernstein basis polynomial equations)

Input file format:
   number of equations (N), number of variables
   degree list for equation 1
   coefficients for equation 1
   ....
   degree list for equation N
   coefficients for equation N

How to make:
   prompt> make

How to run:
   Example in section 5.9 of the hyperbook:
   prompt> ex.5.9 ex.5.9.in