Shape Interrogation for CAD/CAM

All of the generic processing routines, those that are not necessarily specific to hyperbook codes, are put into the one of the libraries, e.g. B-spline routines in the ../lib/bspl library, etc.

Codes for the hyperbook-related executables are under this directory:
e.g. ./Ch_1 contains the routines for some executables related to Chapter 1 of the hyperbook.

The file formats used in the hyperbook-related codes are described as follows:

1. ParCurv, NURBS Curve

n	m		
k_1	k_2	…	k_{m+p}
x_1	y_1	z_1	w_1
x_2	y_2	z_2	w_2
.			
.			
x_m	y_m	z_m	w_m

where n is the order of the curve (order = degree + 1) and m is the number of control points. These are followed by the m+p knots where p equals n for non-periodic NURBS curves, and the m control points in homogeneous coordinates where w is the homogeneous coordinate and must be non-zero. The 3D coordinates x', y', z' of a control point are defined by x'=x/w, y'=y/w, z'=z/w.

2. ParSurf, NURBS Surface

n_u	n_v	m_u	m_v
$k_{u,1}$	$k_{u,2}$	…	$k_{u,mu+nu}$
$k_{v,1}$	$k_{v,2}$	…	$k_{v,mv+nv}$
$x_{1,1}$	$y_{1,1}$	$z_{1,1}$	$w_{1,1}$
$x_{1,2}$	$y_{1,2}$	$z_{1,2}$	$w_{1,2}$
.			
.			
$x_{1,mv}$	$y_{1,mv}$	$z_{1,mv}$	$w_{1,mv}$
$x_{2,1}$	$y_{2,1}$	$z_{2,1}$	$w_{2,1}$
.			
.			
$x_{mu,mv}$	$y_{mu,mv}$	$z_{mu,mv}$	$w_{mu,mv}$

where n_u, n_v are the orders of the surface (order = degree + 1) in the u and v directions and m_u, m_v are the numbers of control points in the u and v directions. These are followed by the m_u+n_u knots in the u direction, the m_v+n_v knots in the v direction, and the m_uxm_v control points in homogeneous coordinates, stored as a series of control polygons in the v direction. The homogeneous coordinate w must be non-zero. The 3D coordinates x', y', z' of a control point are defined by x'=x/w, y'=y/w, z'=z/w.

3. Vector Graphics Results

op_1 x_1 y_1 z_1
op_2 x_2 y_2 z_2
.
.
.
op_n x_n y_n z_n
E

where op is either M, indicating a move operation, or D, indicating a draw operation. The file is read until the final E is found.