Arc / NURBS Fitting

The Curve Fitting (CRVFIT) process converts a set of linear input points (GOTO/x,y,z(,i,j,k)) into an arc or NURBS motion that fits the tolerance and other given options. This may reduce the MCD (Machine Code Data) file size and/or generate a smoother machining operation.

The Curve Fitting (CRVFIT) process has been implemented in both the Intercim APT and GPost systems. The difference being, it is optional with the APT system and must be purchased to be used with your custom posts. It is a standard feature of the GPost and no additional purchase is needed.

APT setup requirements:

The **CRVFIT/---** commands must be specified in the input APT source to turn on this feature. This will inform the APT processor to examine the subsequent CL records and convert the proper **GOTO/x,y,z(,i,j,k)** points into circular **ARC/SPLINE** motion. All Curve Fitting (CRVFIT) options must be controlled via the **CRVFIT/---** commands for APT. Also, you can place these commands in your **UNCAPT.INI** file. This will allow site specific tolerance, etc. to be stated for curve fit.

GPost setup requirements:

When using the GPost to perform the Curve Fitting (CRVFIT) routine you must set INTCOM(4334) = 1 in the option file using the Option File Generator, from the **"Common/PLABELs"** panel. Setting INTCOM(4334) = 1 instructs the GPost to pre-scan the input CL file and convert the proper **GOTO/x,y,z(,i,j,k)** into an arc or NURBS motion data.

Note:
The new JAVA version of the Option File Generator will have a separate panel which will allow you to activate (i.e. Set INTCOM(4334) = 1) and set all of the default parameters for the Curve Fitting (CRVFIT) routines. You can use this panel to set the values or use the **CRVFIT/---** commands in the input CLfile.

Note:
You can **NOT** use **CRVFIT/---** commands in a FIL file as the curve fitting process is completed prior to FIL being executed. Again, you can set the **CRVFIT/---** options globally in option file or in the input file.

Curve fitting vocabulary words:

Two new words have been added to the system vocabulary table to provide curve fitting control in any program. You need not specify these PPWORDs since they are built-in.

    PPWORD/CRVFIT,1093
    PPWORD/MOVNRB,1094

The CRVFIT command:

CRVFIT/ARC,ON

This command initiates the "arc fit" process of the CL file. The next non-RAPID **GOTO/x,y,z(,i,j,k)** will start the arc fitting process and it will continue until a non-GOTO CL record or the maximum number of points is encountered.

Sets DBLCOM(994) = 71

CRVFIT/ARC,OFF

This command disables the "arc fit" process of the CL file. No arc fitting will be executed until **CRVFIT/ARC,ON** is encountered.

Sets DBLCOM(994) = 72

During the arc fitting process a set of linear **GOTO/x,y,z(,i,j,k)** points are converted into circular motion that fit the tolerance and other options specified. This may reduce the MCD file size or generate a smooth machining operation.

The following commands specify various options for arc fitting:

CRVFIT/ARCSLP,ON-OFF

  Allows helical motion with arc fitting. The default is OFF.

  Sets DBLCOM(995) = 71 (ON) or 72 (OFF)

CRVFIT/XYZ,0-1

  Specifies a condition to output arc data as **MOVNRB/---** to support circular interpolation in any plane, such as Siemens CIP format.

    0 = no 3D arc. Default
    1 = output 3D arc data

  Sets DBLCOM(1009)

CRVFIT/RADIUS,1,r1

This command specifies the minimum radius allowed.

r1 = minimum radius allowed. Default = 0.0001

Sets DBLCOM(1010)

CRVFIT/RADIUS,2,r2

This command specifies the maximum radius allowed.

r2 = maximum radius allowed. Default = 99999.0

Sets DBLCOM(1011)

Note:
It is suggested not to change these values, since the GPost has a maximum radius and will switch into linear interpolation for any large radius automatically.

CRVFIT/SPLINE,ON

This command initiates the "spline/NURBS fit" process of the CL file.

Sets DBLCOM(996) = 71 or ON

CRVFIT/SPLINE,OFF

This command terminates the "spline/NURBS fit" process of the CL file.

Sets DBLCOM(996) = 72 or OFF, Default

The NURBS fitting process is to convert a set of linear **GOTO/x,y,z(,i,j,k)** into NURBS curve motion that fit the tolerance and other options specified. This may reduce the MCD file size or generate a smooth machining operation.

The output of NURBS parameters and the points of the NURBS curve will be output as **MOVNRB/---** command as explained later in this document.

Arc / NURBS Fitting

The following commands specify various options for arc/NURBS fitting:
See the FAQ section for a detailed description.

CRVFIT/TYPE,e1

   e1 = specifies the type of spline required, 0= NURBS, 1=Cubic spline. Default is 0

   Sets DBLCOM(997)

CRVFIT/PLANE,YXPLAN-YZPLAN-ZXPLAN-ALL

   Specifies the desired plane, Default = ALL

   Sets DBLCOM(998)

CRVFIT/TOLER,1,t1

   t1 = General curve fit tolerance. Default = 0.005

   Sets DBLCOM(1001)

CRVFIT/TOLER,2,t2

   t2 = Z-change tolerance. Default = 0.005

   Sets DBLCOM(1002)

CRVFIT/TOLER,3,t3

   t3 = Tool axis vector change tolerance. Default = 0.005

   Sets DBLCOM(1003)

CRVFIT/TOLER,4,t4

   t4 = Direction change tolerance in degrees. Default = 60

   Sets DBLCOM(1004)

CRVFIT/TOLER,5,t5

   t5 = Distance length tolerance. Default = .5

   Sets DBLCOM(1005)

CRVFIT/TOLER,6,t6

t6 = Z-change tolerance with ARCSLP=ON. Default = .015

Sets DBLCOM(1006)

CRVFIT/TOLER,7,t7

t7 = Arc fitting ratio tolerance (arcs to GOTO points) in percentage. Default = 10

Sets DBLCOM(1007)

CRVFIT/TOLER,8,t8

t8 = Chordal tolerance for adjacent points. Default = .025

Sets DBLCOM(1008)

CRVFIT/POINT,1,p1

p1 = Minimum number of points allowed. Default = 5

Sets DBLCOM(1010)

CRVFIT/POINT,2,p2

P2 = Maximum number of points allowed. Default = 500

Sets DBLCOM(1011)

CL generated from CRVFIT/--- Commands:

When the curve fitting process is successful, the CL file will be augmented with **CIRCLE/---** and/or **MOVNRB/---** commands. The **CIRCLE/---** command is the standard GPost format therefore it will be converted into G02/G03 blocks.

The **MOVNRB/---** command represents a spline motion and will have to be formatted for the proper controller (FANUC, Siemens, etc.) Also a **MOVNRB/---** will be generated by the optional **CRVFIT/XYZ,1** option to output a Siemens CIP block.

A. The sequence of a **MOVNRB/---** for a regular NURBS, **CRVFIT/TYPE,0**, is as follows:

1. **MOVNRB/ON,o,k,w,n,s**
2. **MOVNRB/1,k1..kk**

3. **MOVNRB/2,***cp1...cpn*
4. **MOVNRB/NEXT**
     GOTO/*p1,p2...pn*
5. **MOVNRB/OFF**

The 1st line specifies the (*o* = order of the curve, *k* = number of knots, *w* = number of weights as always 0, *n* = number of control points, *s* = curve length).

The 2nd line specifies the actual knot values as scalars. The maximum number of knot values will be 24 in one command. If there are more knots, then there will be another **MOVNRB/1** command and so on.

The 3rd line specifies the actual control points as xyz data. The maximum number of xyz values will be 24 in one command. If there are more points, then there will be another **MOVNRB/2** command and so on.

The 4th line specifies the start of the original points that were converted into spline data. This is given, in case the machine does not have a certain NURBS function and can output G01 motion, ignoring the **MOVNRB** command.

The 5th line indicates the end of **MOVNRB** sequence.

B. The sequence of a **MOVNRB/---** command for a cubic spline, **CRVFIT/TYPE,1** is as follows: There will not be any knot values and only control points.

1. **MOVNRB/ON,***o,k=0,w,n,s*
2. **MOVNRB/2,***cp1...cpn*
3. **MOVNRB/NEXT**
     GOTO/*p1,p2...pn*
4. **MOVNRB/OFF**

The control points actually represent the polynomial coefficients for a cubic spline. These are the three vector data along xyz axes and the start point. The parameter space *t* = is from 0 to 1, to satisfy the equation d+at+ bt^2+ct^3. For each curve segment, there will be 12-scalar values (1-3 = d start xyz, 4-6 = a(xyz), 7-9 = b(xyz), 10-12 = c(xyz).

To compute the end point of a curve segment: set *t* = 1 and compute:

$$xe = xs + at + bt^2 + ct^3 \text{ (with abc(x))}$$
$$ye = ys + at + bt^2 + ct^3 \text{ (with abc(y))}$$
$$ze = zs + at + bt^2 + ct^3 \text{ (with abc(y))}$$

C. The sequence of a **MOVNRB/---** for an arc, **CRVFIT/XYZ,1**, is as follows: There will be 7 knot values and 2 control points.

1. **MOVNRB/ON,***o=3,k=7,w,n=2,s*
2. **MOVNRB/1,***xyz,ijk,r*
3. **MOVNRB/2,***cp1,cp2*
4. **MOVNRB/NEXT**
   CIRCLE/*xyz,ijk,r*
   GOTO/*p1,p2,…,pn*
5. **MOVNRB/OFF**

The knot values represent the circle center (*xyz*), axis (*ijk*) and radius (*r*). The 1st control point is the mid point of the arc and the 2nd control point is the end point of the arc. This can be used to output the Siemens CIP block and skip the **CIRCLE/---** and original **GOTO/***x,y,z(,i,j,k)* for the arc.

Arc / NURBS Fitting - FAQ

Q: When will linear moves, G01's, be replaced with circular moves, G02's and/or G03's?

A: When a set of **GOTO/x,y,z(,i,j,k)** records appear together in the CL file.

Q: When will the curve fitting take place?

A: At the start of APT/GPost run, a separate pass of the CL file will be made to scan and convert linear move, G01, commands into circular moves, G02/G03, commands.

Q: How is curve fitting setup and activated?

A: Use the previously described **CRVFIT/---** commands to control curve fit option within the CL file.

Q: Will the programmed feed rates be used?

A: Curve fit will not span across a **FEDRAT/---** or any other GPost command, only **GOTO/x,y,z(,i,j,k)** within the span will be qualified. The minimum and maximum number of points stated control the point set selected. It is suggested that you do not set the maximum points more than 500 due to performance.

Q: Will the arc fitting substitute helical motion for linear motion, G01's?

A: Yes – using the **CRVFIT/ARCSLP,ON** option. This will check the Z-change along the tool axis to be constant and be within the stated tolerance, as specified by the **CRVFIT/TOLER,6,t6** command. When this is satisfied, an **ARCSLP/ON,---** command will be output before the circular motion. This will instruct the GPost to perform helical interpolation motion for the circular records in the MCD file (G02/G03 blocks will contain I, J, K lead values).

Q: Will arc fitting produce circular motion, G02 and G03's, when the tool axis is not fixed (constant)?

A: No - the tool axis must remain constant for both arc and NURBS fitting.

Q: How does the **CUTCOM/---** command work with curve fitting?

A: Linear moves, G01, before and after **CUTCOM/---** will be left alone since the point set will not span a post processor command as stated before.

> **Note:** The **CUTCOM/**_plane_ must be in the same plane as the circular plane, G02/G03. this condition is tested by GPost.

Q: When a square corner is wanted, how will curve fitting be avoided?

A: Use the tolerance parameter **CRVFIT/TOLER,4,t4** to control the maximum degrees or turn off arc fitting using the **CRVFIT/ARC,OFF** command.

Arc / NURBS Fitting - FAQ

Q: What are the tolerances (**CRVFIT/TOLER,--,--**) commands used for?
A: Start and end points of the arc will be from the input CL file and are not interpolated. Interim points can be discarded by the arc fitting routine using the given tolerance $t1$ specified by the **CRVFIT/TOLER,1,**$t1$ command.

The general curve fitting tolerance $t1$ is used for all arc fitting and NURBS curves creation and interpolation etc.

The chordal tolerence $t8$, specified by the **CRVFIT/TOLER,8,**$t8$ command, is used to accept adjacent points and to determine if they are on the circle or spline.

The z-tolerance $t2$, specified by the **CRVFIT/TOLER,2,**$t2$ command, is used to test if the input points, when rotated into the XY-plane, have the same z-value. Only points that are in the same plane will be selected for curve fitting.

If **ARCSLP/ON** is programmed, two adjacent points must have a z-change but can not exceed the second z by tolerance $t6$, specified by the **CRVFIT/TOLER,6,**$t6$ command. This will prevent a desired delta-z move from being converted into an helical motion.

The tool axis vector tolerance $t3$, specified by the **CRVFIT/TOLER,3,**$t3$ command, is used to test if the input tool axis is a constant. Only points with the same tool axis vector will be selected for curve fitting.

The direction tolerance $t4$, specified by the **CRVFIT/TOLER,4,**$t4$ command, is used to accept adjacent points and to determine if there is a reversal in direction or steep angular change. Note this values is given in degrees.

The distance tolerance $t5$, specified by the **CRVFIT/TOLER,5,**$t5$ command, is used to accept adjacent points and to determine if the points are too far apart from each other, such as a long linear move.

The ratio tolerance $t7$, specified by the **CRVFIT/TOLER,7,**$t7$ command, is tested after the arc fitting. If the number of arcs fit exceed this ratio to the original points, then the arc fitting for this region is skipped and the original **GOTO/x,y,z(,I,j,k)** points will be used. For instance, if we selected 100 points for a region and we converted those to 90 or less arcs, the tolerance must <= 10% to accept the arc fitting.

Q: What about **GOTO/x,y,z(,I,j,k)** motion inside **CYCLE/---** routine?
A: **CYCLE/points** between **CYCLE/ON-OFF** pair will not qualify for curve fit.

Q: What kind of added center-line records does arc fitting generate?

A: An **ARCDAT/---** or type 3000 circle record followed by **ARCMOV/---**. The GPost will not know if the arcs were generated by the arc fitting routine and they will look the same as if they where generated by APT or a CAD system.

Arc / NURBS Fitting - FAQ

Q: Will arc fitting generate G18/G19 circular interpolation?
A: Yes - unless the **XYPLAN** is specified in the **CRVFIT/PLANE** command.

Q: What happens to the original ISN or Input statement numbers in APT?
A: If we select 100 points from the CL file as a set and fit one arc, the arc motion (the **CIRCLE/---** and **GOTO/---**) records will have the ISN of the first **GOTO/x,y,z(,I,j,k)** of this selected set.

Q: What about **GOTO/x,y,z(,I,j,k)** motion inside a **PROBE/---** sequence?
A: **PROBE/---** points between **PROBE/ON-OFF** pair will not qualify for curve fitting.

Q: What about **GOTO/x,y,z(,I,j,k)** motion with the **RAPID** command?
A: **RAPID** motion points will not qualify for curve fitting.

Q: What about **FROM/x,y,z(,I,j,k)** motion command?
A: **FROM** motion points will not qualify for curve fitting.

Examples:

There are several test files available for both APT and GPost for **CRVFIT** implementation. You can obtain these test files from Intercim free of charge. Visit our WEB Site www.austinnc.com and go to the Support page to download the Curve Fitting test files. Look at the FIL files to get an understanding of the various formats from **CRVFIT**. This will help you to implement the MCD format in your custom post.

For GPost, you can simply select the desired format FANUC, Siemens, etc. in the option file generator and the MCD is automatically formatted.

1. A simple example of Arc fit in APT and output:

Intercim Cimpro/Win32 APT version 5.4 B-3.0
 Input file=T1.APT Date=06-23-2000 Time=13:43:55
 13:43:55 Scheduled Section 1-1
   Isn   ** APT Input Data **

     1 PARTNO ARCFIT
     2 MACHIN/UNCX01,1
     3 MULTAX/ON
     4 CLPRNT
     5 CUTTER/0,0,0,0,0,0,5
     6 SPINDL/300
     7 FEDRAT/10
     8 CRVFIT/ARC,ON
     9 FROM /.70710678,0,-.70710678,.70710678,0,.70710678
    10 GOTO /.70699909,.01745241,-.70699908,.70710678,0,.70710678
    11 GOTO /.70667603,.0348995,-.70667603,.70710678,0,.70710678
    12 GOTO /.70613772,.05233596,-.70613772,.70710678,0,.70710678
    13 GOTO /.70538431,.06975647,-.7053843,.70710678,0,.70710678
    14 GOTO /.70441603,.08715574,-.70441603,.70710678,0,.70710678
    15 GOTO /.70323318,.10452846,-.70323318,.70710678,0,.70710678
    16 GOTO /.70183612,.12186934,-.70183611,.70710678,0,.70710678
    17 GOTO /.70022527,.1391731,-.70022527,.70710678,0,.70710678
    18 GOTO /.69840112,.15643446,-.69840112,.70710678,0,.70710678
    19 GOTO /.69636424,.17364818,-.69636424,.70710678,0,.70710678
    20 GOTO /.69411524,.190809,-.69411524,.70710678,0,.70710678
    21 GOTO /.6916548,.20791169,-.6916548,.70710678,0,.70710678
    22 GOTO /.68898368,.22495105,-.68898368,.70710678,0,.70710678
    23 GOTO /.68610269,.2419219,-.68610269,.70710678,0,.70710678
    24 GOTO /.6830127,.25881904,-.6830127,.70710678,0,.70710678
    25 GOTO /.67971466,.27563736,-.67971466,.70710678,0,.70710678
    26 GOTO /.67620958,.2923717,-.67620958,.70710678,0,.70710678
    27 GOTO /.67249851,.30901699,-.67249851,.70710678,0,.70710678
    28 GOTO /.6685826,.32556815,-.6685826,.70710678,0,.70710678
    29 GOTO /.66446303,.34202014,-.66446302,.70710678,0,.70710678

30 *GOTO* /.66014105,.35836795,-.66014105,.70710678,0,.70710678
31 *GOTO* /.65561799,.37460659,-.65561799,.70710678,0,.70710678
32 *GOTO* /.65089522,.39073113,-.65089522,.70710678,0,.70710678
33 *GOTO* /.64597419,.40673664,-.64597419,.70710678,0,.70710678
34 *GOTO* /.64085638,.42261826,-.64085638,.70710678,0,.70710678
35 *GOTO* /.63554337,.43837115,-.63554336,.70710678,0,.70710678
36 *GOTO* /.63003676,.4539905,-.63003675,.70710678,0,.70710678
37 *GOTO* /.62433823,.46947156,-.62433823,.70710678,0,.70710678
38 *GOTO* /.61844953,.48480962,-.61844953,.70710678,0,.70710678
39 *GOTO* /.61237244,.5,-.61237244,.70710678,0,.70710678
40 *GOTO* /.60610881,.51503807,-.60610881,.70710678,0,.70710678
41 *GOTO* /.59966056,.52991926,-.59966056,.70710678,0,.70710678
42 *GOTO* /.59302965,.54463903,-.59302965,.70710678,0,.70710678
43 *GOTO* /.58621809,.5591929,-.58621809,.70710678,0,.70710678
44 *GOTO* /.57922797,.57357644,-.57922797,.70710678,0,.70710678
45 *GOTO* /.5720614,.58778525,-.5720614,.70710678,0,.70710678
46 *GOTO* /.56472059,.60181502,-.56472058,.70710678,0,.70710678
47 *GOTO* /.55720775,.61566147,-.55720775,.70710678,0,.70710678
48 *GOTO* /.54952518,.62932039,-.54952518,.70710678,0,.70710678
49 *GOTO* /.54167522,.64278761,-.54167522,.70710678,0,.70710678
50 *GOTO* /.53366026,.65605903,-.53366026,.70710678,0,.70710678
51 *GOTO* /.52548275,.66913061,-.52548275,.70710678,0,.70710678
52 *GOTO* /.51714516,.68199836,-.51714516,.70710678,0,.70710678
53 *GOTO* /.50865005,.69465837,-.50865005,.70710678,0,.70710678
54 *GOTO* /.5,.70710678,-.5,.70710678,0,.70710678
55 *GOTO* /.49119765,.7193398,-.49119764,.70710678,0,.70710678
56 *GOTO* /.48224567,.7313537,-.48224567,.70710678,0,.70710678
57 *GOTO* /.47314679,.74314482,-.47314679,.70710678,0,.70710678
58 *GOTO* /.46390379,.75470958,-.46390379,.70710678,0,.70710678
59 *GOTO* /.45451948,.76604444,-.45451948,.70710678,0,.70710678
60 *GOTO* /.44499672,.77714596,-.44499672,.70710678,0,.70710678
61 *GOTO* /.43533841,.78801075,-.4353384,.70710678,0,.70710678
62 *GOTO* /.42554748,.79863551,-.42554748,.70710678,0,.70710678
63 *GOTO* /.41562694,.80901699,-.41562694,.70710678,0,.70710678
64 *GOTO* /.40557979,.81915204,-.40557979,.70710678,0,.70710678
65 *GOTO* /.3954091,.82903757,-.39540909,.70710678,0,.70710678
66 *GOTO* /.38511796,.83867057,-.38511796,.70710678,0,.70710678
67 *GOTO* /.37470951,.8480481,-.37470951,.70710678,0,.70710678
68 *GOTO* /.36418692,.8571673,-.36418692,.70710678,0,.70710678
69 *GOTO* /.35355339,.8660254,-.35355339,.70710678,0,.70710678
70 *GOTO* /.34281217,.87461971,-.34281217,.70710678,0,.70710678
71 *GOTO* /.33196653,.88294759,-.33196653,.70710678,0,.70710678
72 *GOTO* /.32101976,.89100652,-.32101976,.70710678,0,.70710678
73 *GOTO* /.30997521,.89879405,-.30997521,.70710678,0,.70710678
74 *GOTO* /.29883624,.90630779,-.29883624,.70710678,0,.70710678
75 *GOTO* /.28760624,.91354546,-.28760624,.70710678,0,.70710678

```
 76 GOTO  /.27628863,.92050485,-.27628863,.70710678,0,.70710678
 77 GOTO  /.26488686,.92718385,-.26488686,.70710678,0,.70710678
 78 GOTO  /.25340441,.93358043,-.25340441,.70710678,0,.70710678
 79 GOTO  /.24184476,.93969262,-.24184476,.70710678,0,.70710678
 80 GOTO  /.23021145,.94551858,-.23021145,.70710678,0,.70710678
 81 GOTO  /.21850801,.95105652,-.21850801,.70710678,0,.70710678
 82 GOTO  /.20673802,.95630476,-.20673802,.70710678,0,.70710678
 83 GOTO  /.19490504,.9612617,-.19490504,.70710678,0,.70710678
 84 GOTO  /.1830127,.96592583,-.1830127,.70710678,0,.70710678
 85 GOTO  /.17106461,.97029573,-.17106461,.70710678,0,.70710678
 86 GOTO  /.15906442,.97437006,-.15906442,.70710678,0,.70710678
 87 GOTO  /.14701577,.9781476,-.14701577,.70710678,0,.70710678
 88 GOTO  /.13492234,.98162718,-.13492234,.70710678,0,.70710678
 89 GOTO  /.12278781,.98480775,-.1227878,.70710678,0,.70710678
 90 GOTO  /.11061587,.98768834,-.11061587,.70710678,0,.70710678
 91 GOTO  /.09841024,.99026807,-.09841024,.70710678,0,.70710678
 92 GOTO  /.08617464,.99254615,-.08617464,.70710678,0,.70710678
 93 GOTO  /.07391279,.9945219,-.07391279,.70710678,0,.70710678
 94 GOTO  /.06162842,.9961947,-.06162842,.70710678,0,.70710678
 95 GOTO  /.04932528,.99756405,-.04932528,.70710678,0,.70710678
 96 GOTO  /.03700711,.99862953,-.03700711,.70710678,0,.70710678
 97 GOTO  /.02467767,.99939083,-.02467767,.70710678,0,.70710678
 98 GOTO  /.01234072,.9998477,-.01234072,.70710678,0,.70710678
 99 GOTO  /0,1,0,.70710678,0,.70710678
100 GOTO  /.70710678,0,-.70710678,.70710678,0,.70710678
101 END
101 FINI$$
13:43:55 Scheduled Section 1-2
13:43:56 Scheduled Section 2
13:43:56 Scheduled Section 3
```

 Rec Isn   ** Cutter Location File Data **

	Rec	Isn								
	2	1	PARTNO ARCFIT							
	4	2	MACHIN UNCX01 1							
	6	3	MULTAX/ON							
	8	5	CUTTER 0 0 0 0 0 0 5							
	10	6	SPINDL 300							
	12	7	FEDRAT 10							
	15	9	FROM	.7071068	.0000000	-.7071068	.7071068	.0000000	.7071068	
	18	10	GOTO	.7069991	.0174524	-.7069991	.7071068	.0000000	.7071068	
0	19	10	CIRCLE	.0054700	.0001347	-.0054374	.7071232	.0000010	.7070904	.9922861
	20	10	GOTO	.7004799	.1361827	-.7004798	.7071068	.0000000	.7071068	
				.6839504	.2529534	-.6839496	.7071068	.0000000	.7071068	
				.6576485	.3660827	-.6576467	.7071068	.0000000	.7071068	
0	21	10	CIRCLE	-.0002480	-.0030738	.0002808	.7071232	.0000010	.7070904	1.0009860

22	10 GOTO	.6219964	.4739587	-.6219931	.7071068	.0000000	.7071068	
		.5775386	.5750840	-.5775333	.7071068	.0000000	.7071068	
		.5249042	.6680274	-.5248966	.7071068	.0000000	.7071068	
0 23	10 CIRCLE	-.0069309	-.0116140	.0069641	.7071232	.0000010	.7070904	1.0137242
24	10 GOTO	.4604853	.7569298	-.4604749	.7071068	.0000000	.7071068	
		.3886963	.8337140	-.3886827	.7071068	.0000000	.7071068	
		.3106692	.8971692	-.3106520	.7071068	.0000000	.7071068	
		.2873530	.9127354	-.2873348	.7071068	.0000000	.7071068	
0 25	10 CIRCLE	.0000173	.0102103	.0000155	.7071232	.0000010	.7070904	.9897897
26	10 GOTO	.2041001	.9569836	-.2040781	.7071068	.0000000	.7071068	
		.1175515	.9859426	-.1175255	.7071068	.0000000	.7071068	
		.0291048	.9991447	-.0290748	.7071068	.0000000	.7071068	
		.0000157	1.0000000	.0000157	.7071068	.0000000	.7071068	
27	10 GOTO	.7071068	.0000000	-.7071068	.7071068	.0000000	.7071068	
29	101 END							
31	101 FINI							

13:43:56 Scheduled Post UNCASC
13:43:56 Completed OK
13:43:56 Scheduled Post UNCX01
   NOTICE Using option file 1 from default directory.
   NOTICE Using filter file 1 from default directory.
1INTERCIM FIL 05.400.WN00
    -1 FINI

1

1 INTERCIM UNCX01 5.4.WN00 B- 3.0 MACHIN/UNCX01, 1 DATE: 6/23/2000   PAGE 1
FANUC 5-AXIS NURB
 ARCFIT   (INCH)
 INPUT CLREC N4G2Q24P5X34Y34R34Z34A43B33I34J34K34F32S5T2D2H2M2E2L4W32

3	6 $ ARCFIT				
6	10 N1 M41$				
6	10 N2 S00300 M03$				
10	18 N3 G1 X.9998 Y.0175 Z0. A90. B45. F10.$	.9998	.0175	.0000 90.000 45.000
10	21 N4 G3 X.9301 Y.3661 I-.9921 J-.0174$	.9301	.3661	
10	23 N5 G3 X.7423 Y.668 I-.9305 J-.3692$	.7423	.6680	
10	25 N6 G3 X.4064 Y.9127 I-.7521 J-.6796$	.4064	.9127	
10	27 N7 G3 X0. Y1. I-.4064 J-.9025$	.0000	1.0000	
10	27 N8 G1 X1. Y0.$	1.0000	.0000	
101	29 N9 M02$				
101	31 %$				

0	TAPE	TIME	WARNING
PAGE	1.56	.30	0
TOTAL	1.56	.30	0

Arc / NURBS Fitting

1 INTERCIM UNCX01 5.4.WN00 B- 3.0 MACHIN/UNCX01, 1 DATE: 6/23/2000   PAGE 2
 FANUC 5-AXIS NURB
 ARCFIT   (INCH)
 INPUT CLREC N4G2Q24P5X34Y34R34Z34A43B33I34J34K34F32S5T2D2H2M2E2L4W32

	X-AXIS	Y-AXIS	Z-AXIS
POST-MINIMUM	.0000	.0000	.0000
POST-MAXIMUM	10.0000	10.0000	30.0000
TAPE-MINIMUM	.0000	.0000	.0000
TAPE-MAXIMUM	1.0000	1.0000	.0000

	A-AXIS	B-AXIS	C-AXIS
POST-MINIMUM	90.0000	45.0000	.0000
POST-MAXIMUM	90.0000	45.0000	.0000
TAPE-MINIMUM	90.0000	45.0000	.0000
TAPE-MAXIMUM	90.0000	45.0000	.0000

13:43:56 Completed Post UNCX01 ok

2. A simple example of NURBS fit in APT and output: (same program as above)

```
1Intercim Cimpro/Win32 APT version 5.4 B-3.0
 Input file=T11.APT Date=06-28-2000 Time=08:25:09
 08:25:09 Scheduled Section 1-1
  Isn    ** APT Input Data **

    1 PARTNO NURB FIT
    2 MACHIN/UNCX01,11
    3 MULTAX/ON
    4 CLPRNT
    5 CUTTER/0,0,0,0,0,0,5
    6 SPINDL/300
    7 FEDRAT/10
    8 CRVFIT/SPLINE,ON
    9 FROM  /.70710678,0,-.70710678,.70710678,0,.70710678
   10 GOTO  /.70699909,.01745241,-.70699908,.70710678,0,.70710678
   11 GOTO  /.70667603,.0348995,-.70667603,.70710678,0,.70710678
   12 GOTO  /.70613772,.05233596,-.70613772,.70710678,0,.70710678
   13 GOTO  /.70538431,.06975647,-.7053843,.70710678,0,.70710678
   14 GOTO  /.70441603,.08715574,-.70441603,.70710678,0,.70710678
   15 GOTO  /.70323318,.10452846,-.70323318,.70710678,0,.70710678
   16 GOTO  /.70183612,.12186934,-.70183611,.70710678,0,.70710678
   17 GOTO  /.70022527,.1391731,-.70022527,.70710678,0,.70710678
   18 GOTO  /.69840112,.15643446,-.69840112,.70710678,0,.70710678
   19 GOTO  /.69636424,.17364818,-.69636424,.70710678,0,.70710678
   20 GOTO  /.69411524,.190809,-.69411524,.70710678,0,.70710678
   21 GOTO  /.6916548,.20791169,-.6916548,.70710678,0,.70710678
   22 GOTO  /.68898368,.22495105,-.68898368,.70710678,0,.70710678
   23 GOTO  /.68610269,.2419219,-.68610269,.70710678,0,.70710678
   24 GOTO  /.6830127,.25881904,-.6830127,.70710678,0,.70710678
   25 GOTO  /.67971466,.27563736,-.67971466,.70710678,0,.70710678
   26 GOTO  /.67620958,.2923717,-.67620958,.70710678,0,.70710678
   27 GOTO  /.67249851,.30901699,-.67249851,.70710678,0,.70710678
   28 GOTO  /.6685826,.32556815,-.6685826,.70710678,0,.70710678
   29 GOTO  /.66446303,.34202014,-.66446302,.70710678,0,.70710678
   30 GOTO  /.66014105,.35836795,-.66014105,.70710678,0,.70710678
   31 GOTO  /.65561799,.37460659,-.65561799,.70710678,0,.70710678
   32 GOTO  /.65089522,.39073113,-.65089522,.70710678,0,.70710678
   33 GOTO  /.64597419,.40673664,-.64597419,.70710678,0,.70710678
   34 GOTO  /.64085638,.42261826,-.64085638,.70710678,0,.70710678
   35 GOTO  /.63554337,.43837115,-.63554336,.70710678,0,.70710678
   36 GOTO  /.63003676,.4539905,-.63003675,.70710678,0,.70710678
   37 GOTO  /.62433823,.46947156,-.62433823,.70710678,0,.70710678
   38 GOTO  /.61844953,.48480962,-.61844953,.70710678,0,.70710678
   39 GOTO  /.61237244,.5,-.61237244,.70710678,0,.70710678
```

```
40 GOTO  /.60610881,.51503807,-.60610881,.70710678,0,.70710678
41 GOTO  /.59966056,.52991926,-.59966056,.70710678,0,.70710678
42 GOTO  /.59302965,.54463903,-.59302965,.70710678,0,.70710678
43 GOTO  /.58621809,.5591929,-.58621809,.70710678,0,.70710678
44 GOTO  /.57922797,.57357644,-.57922797,.70710678,0,.70710678
45 GOTO  /.5720614,.58778525,-.5720614,.70710678,0,.70710678
46 GOTO  /.56472059,.60181502,-.56472058,.70710678,0,.70710678
47 GOTO  /.55720775,.61566147,-.55720775,.70710678,0,.70710678
48 GOTO  /.54952518,.62932039,-.54952518,.70710678,0,.70710678
49 GOTO  /.54167522,.64278761,-.54167522,.70710678,0,.70710678
50 GOTO  /.53366026,.65605903,-.53366026,.70710678,0,.70710678
51 GOTO  /.52548275,.66913061,-.52548275,.70710678,0,.70710678
52 GOTO  /.51714516,.68199836,-.51714516,.70710678,0,.70710678
53 GOTO  /.50865005,.69465837,-.50865005,.70710678,0,.70710678
54 GOTO  /.5,.70710678,-.5,.70710678,0,.70710678
55 GOTO  /.49119765,.7193398,-.49119764,.70710678,0,.70710678
56 GOTO  /.48224567,.7313537,-.48224567,.70710678,0,.70710678
57 GOTO  /.47314679,.74314482,-.47314679,.70710678,0,.70710678
58 GOTO  /.46390379,.75470958,-.46390379,.70710678,0,.70710678
59 GOTO  /.45451948,.76604444,-.45451948,.70710678,0,.70710678
60 GOTO  /.44499672,.77714596,-.44499672,.70710678,0,.70710678
61 GOTO  /.43533841,.78801075,-.4353384,.70710678,0,.70710678
62 GOTO  /.42554748,.79863551,-.42554748,.70710678,0,.70710678
63 GOTO  /.41562694,.80901699,-.41562694,.70710678,0,.70710678
64 GOTO  /.40557979,.81915204,-.40557979,.70710678,0,.70710678
65 GOTO  /.3954091,.82903757,-.39540909,.70710678,0,.70710678
66 GOTO  /.38511796,.83867057,-.38511796,.70710678,0,.70710678
67 GOTO  /.37470951,.8480481,-.37470951,.70710678,0,.70710678
68 GOTO  /.36418692,.8571673,-.36418692,.70710678,0,.70710678
69 GOTO  /.35355339,.8660254,-.35355339,.70710678,0,.70710678
70 GOTO  /.34281217,.87461971,-.34281217,.70710678,0,.70710678
71 GOTO  /.33196653,.88294759,-.33196653,.70710678,0,.70710678
72 GOTO  /.32101976,.89100652,-.32101976,.70710678,0,.70710678
73 GOTO  /.30997521,.89879405,-.30997521,.70710678,0,.70710678
74 GOTO  /.29883624,.90630779,-.29883624,.70710678,0,.70710678
75 GOTO  /.28760624,.91354546,-.28760624,.70710678,0,.70710678
76 GOTO  /.27628863,.92050485,-.27628863,.70710678,0,.70710678
77 GOTO  /.26488686,.92718385,-.26488686,.70710678,0,.70710678
78 GOTO  /.25340441,.93358043,-.25340441,.70710678,0,.70710678
79 GOTO  /.24184476,.93969262,-.24184476,.70710678,0,.70710678
80 GOTO  /.23021145,.94551858,-.23021145,.70710678,0,.70710678
81 GOTO  /.21850801,.95105652,-.21850801,.70710678,0,.70710678
82 GOTO  /.20673802,.95630476,-.20673802,.70710678,0,.70710678
83 GOTO  /.19490504,.9612617,-.19490504,.70710678,0,.70710678
84 GOTO  /.1830127,.96592583,-.1830127,.70710678,0,.70710678
85 GOTO  /.17106461,.97029573,-.17106461,.70710678,0,.70710678
```

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 86 GOTO  /.15906442,.97437006,-.15906442,.70710678,0,.70710678
 87 GOTO  /.14701577,.9781476,-.14701577,.70710678,0,.70710678
 88 GOTO  /.13492234,.98162718,-.13492234,.70710678,0,.70710678
 89 GOTO  /.12278781,.98480775,-.1227878,.70710678,0,.70710678
 90 GOTO  /.11061587,.98768834,-.11061587,.70710678,0,.70710678
 91 GOTO  /.09841024,.99026807,-.09841024,.70710678,0,.70710678
 92 GOTO  /.08617464,.99254615,-.08617464,.70710678,0,.70710678
 93 GOTO  /.07391279,.9945219,-.07391279,.70710678,0,.70710678
 94 GOTO  /.06162842,.9961947,-.06162842,.70710678,0,.70710678
 95 GOTO  /.04932528,.99756405,-.04932528,.70710678,0,.70710678
 96 GOTO  /.03700711,.99862953,-.03700711,.70710678,0,.70710678
 97 GOTO  /.02467767,.99939083,-.02467767,.70710678,0,.70710678
 98 GOTO  /.01234072,.9998477,-.01234072,.70710678,0,.70710678
 99 GOTO  /0,1,0,.70710678,0,.70710678
100 GOTO  /.70710678,0,-.70710678,.70710678,0,.70710678
101 END
101 FINI$$
08:25:09 Scheduled Section 1-2
08:25:09 Scheduled Section 2
08:25:09 Scheduled Section 3
 Rec  Isn   ** Cutter Location File Data **


  2    1 PARTNO  NURB FIT
  4    2 MACHIN UNCX01 11
  6    3 MULTAX/ON
  8    5 CUTTER 0 0 0 0 0 0 5
 10    6 SPINDL 300
 12    7 FEDRAT 10
 15    9 FROM           .7071068    .0000000   -.7071068    .7071068    .0000000    .7071068
 18   10 MOVNRB ON
             4.0000000   9.0000000    .0000000   5.0000000   1.5514108
 19   10 MOVNRB 1
              .0000000    .0000000    .0000000    .0000000    .4606742   1.0000000   1.0000000
             1.0000000   1.0000000
 20   10 MOVNRB 2
              .7069991    .0174524   -.7069991    .7040554    .2559444   -.7040556    .5598757
              .7674666   -.5598699    .1974726   1.0000004   -.1974503    .0000157   1.0000000
              .0000157
 21   10 MOVNRB NEXT
 22   10 GOTO       .7069991    .0174524   -.7069991    .7071068    .0000000    .7071068
                    .7066760    .0348995   -.7066760    .7071068    .0000000    .7071068
                    .7061377    .0523360   -.7061377    .7071068    .0000000    .7071068
                    .7053843    .0697565   -.7053843    .7071068    .0000000    .7071068
                    .7044160    .0871557   -.7044160    .7071068    .0000000    .7071068
                    .7032332    .1045285   -.7032332    .7071068    .0000000    .7071068
                    .7018361    .1218693   -.7018361    .7071068    .0000000    .7071068
```

.7002253	.1391731	-.7002253	.7071068	.0000000	.7071068
.6984011	.1564345	-.6984011	.7071068	.0000000	.7071068
.6963642	.1736482	-.6963642	.7071068	.0000000	.7071068
.6941152	.1908090	-.6941152	.7071068	.0000000	.7071068
.6916548	.2079117	-.6916548	.7071068	.0000000	.7071068
.6889837	.2249511	-.6889837	.7071068	.0000000	.7071068
.6861027	.2419219	-.6861027	.7071068	.0000000	.7071068
.6830127	.2588190	-.6830127	.7071068	.0000000	.7071068
.6797147	.2756374	-.6797147	.7071068	.0000000	.7071068
.6762096	.2923717	-.6762096	.7071068	.0000000	.7071068
.6724985	.3090170	-.6724985	.7071068	.0000000	.7071068
.6685826	.3255682	-.6685826	.7071068	.0000000	.7071068
.6644630	.3420201	-.6644630	.7071068	.0000000	.7071068
.6601411	.3583679	-.6601411	.7071068	.0000000	.7071068
.6556180	.3746066	-.6556180	.7071068	.0000000	.7071068
.6508952	.3907311	-.6508952	.7071068	.0000000	.7071068
.6459742	.4067366	-.6459742	.7071068	.0000000	.7071068
.6408564	.4226183	-.6408564	.7071068	.0000000	.7071068
.6355434	.4383711	-.6355434	.7071068	.0000000	.7071068
.6300368	.4539905	-.6300368	.7071068	.0000000	.7071068
.6243382	.4694716	-.6243382	.7071068	.0000000	.7071068
.6184495	.4848096	-.6184495	.7071068	.0000000	.7071068
.6123724	.5000000	-.6123724	.7071068	.0000000	.7071068
.6061088	.5150381	-.6061088	.7071068	.0000000	.7071068
.5996606	.5299193	-.5996606	.7071068	.0000000	.7071068
.5930297	.5446390	-.5930297	.7071068	.0000000	.7071068
.5862181	.5591929	-.5862181	.7071068	.0000000	.7071068
.5792280	.5735764	-.5792280	.7071068	.0000000	.7071068
.5720614	.5877853	-.5720614	.7071068	.0000000	.7071068
.5647206	.6018150	-.5647206	.7071068	.0000000	.7071068
.5572078	.6156615	-.5572077	.7071068	.0000000	.7071068
.5495252	.6293204	-.5495252	.7071068	.0000000	.7071068
.5416752	.6427876	-.5416752	.7071068	.0000000	.7071068
.5336603	.6560590	-.5336603	.7071068	.0000000	.7071068
.5254828	.6691306	-.5254828	.7071068	.0000000	.7071068
.5171452	.6819984	-.5171452	.7071068	.0000000	.7071068
.5086500	.6946584	-.5086500	.7071068	.0000000	.7071068
.5000000	.7071068	-.5000000	.7071068	.0000000	.7071068
.4911977	.7193398	-.4911976	.7071068	.0000000	.7071068
.4822457	.7313537	-.4822457	.7071068	.0000000	.7071068
.4731468	.7431448	-.4731468	.7071068	.0000000	.7071068
.4639038	.7547096	-.4639038	.7071068	.0000000	.7071068
.4545195	.7660444	-.4545195	.7071068	.0000000	.7071068
.4449967	.7771460	-.4449967	.7071068	.0000000	.7071068
.4353384	.7880107	-.4353384	.7071068	.0000000	.7071068
.4255475	.7986355	-.4255475	.7071068	.0000000	.7071068

23   10 CONT.

		.4156269	.8090170	-.4156269	.7071068	.0000000	.7071068
		.4055798	.8191520	-.4055798	.7071068	.0000000	.7071068
		.3954091	.8290376	-.3954091	.7071068	.0000000	.7071068
		.3851180	.8386706	-.3851180	.7071068	.0000000	.7071068
		.3747095	.8480481	-.3747095	.7071068	.0000000	.7071068
		.3641869	.8571673	-.3641869	.7071068	.0000000	.7071068
		.3535534	.8660254	-.3535534	.7071068	.0000000	.7071068
		.3428122	.8746197	-.3428122	.7071068	.0000000	.7071068
		.3319665	.8829476	-.3319665	.7071068	.0000000	.7071068
		.3210198	.8910065	-.3210198	.7071068	.0000000	.7071068
		.3099752	.8987941	-.3099752	.7071068	.0000000	.7071068
		.2988362	.9063078	-.2988362	.7071068	.0000000	.7071068
		.2876062	.9135455	-.2876062	.7071068	.0000000	.7071068
		.2762886	.9205049	-.2762886	.7071068	.0000000	.7071068
		.2648869	.9271839	-.2648869	.7071068	.0000000	.7071068
		.2534044	.9335804	-.2534044	.7071068	.0000000	.7071068
		.2418448	.9396926	-.2418448	.7071068	.0000000	.7071068
		.2302115	.9455186	-.2302115	.7071068	.0000000	.7071068
		.2185080	.9510565	-.2185080	.7071068	.0000000	.7071068
		.2067380	.9563048	-.2067380	.7071068	.0000000	.7071068
		.1949050	.9612617	-.1949050	.7071068	.0000000	.7071068
		.1830127	.9659258	-.1830127	.7071068	.0000000	.7071068
		.1710646	.9702957	-.1710646	.7071068	.0000000	.7071068
		.1590644	.9743701	-.1590644	.7071068	.0000000	.7071068
		.1470158	.9781476	-.1470158	.7071068	.0000000	.7071068
		.1349223	.9816272	-.1349223	.7071068	.0000000	.7071068
		.1227878	.9848077	-.1227878	.7071068	.0000000	.7071068
24	10 CONT.	.1106159	.9876883	-.1106159	.7071068	.0000000	.7071068
		.0984102	.9902681	-.0984102	.7071068	.0000000	.7071068
		.0861746	.9925462	-.0861746	.7071068	.0000000	.7071068
		.0739128	.9945219	-.0739128	.7071068	.0000000	.7071068
		.0616284	.9961947	-.0616284	.7071068	.0000000	.7071068
		.0493253	.9975641	-.0493253	.7071068	.0000000	.7071068
		.0370071	.9986295	-.0370071	.7071068	.0000000	.7071068
		.0246777	.9993908	-.0246777	.7071068	.0000000	.7071068
		.0123407	.9998477	-.0123407	.7071068	.0000000	.7071068
		.0000000	1.0000000	.0000000	.7071068	.0000000	.7071068
25	10 MOVNRB OFF						
26	10 GOTO	.7071068	.0000000	-.7071068	.7071068	.0000000	.7071068
28	101 END						
30	101 FINI						

08:25:09 Scheduled Post UNCASC
08:25:09 Completed OK
08:25:10 Scheduled Post UNCX01
    NOTICE Using option file 11 from default directory.
    NOTICE Using filter file 11 from default directory.

```
1INTERCIM FIL 05.400.WN00
    -1 $$ 02-22-00 VNS; SAMPLE FANUC NURB
    -2 PPWORD/MOVNRB,1094
    -3 $$
    -4 $$ CRVFIT/SPLINE,ON
    -5 $$ GOTO/PTS
    -6 $$ CRVFIT/OFF
    -7 $$
    -8 $$ THE ABOVE SEQUENCE WILL GENERATE ADDITIONAL RECORDS AS
    -9 $$ MOVNRB/ON,ORDER,#KNOTS,#WEIGHTS,#CONTROL PTS
   -10 $$ MOVNRB/1,KNOTS...
   -11 $$ MOVNRB/2,CPT-XYZ...
   -12 $$ MOVNRB/NEXT
   -13 $$ GOTO/PTS
   -14 $$ MOVNRB/OFF
   -15 $$
   -16 MXP=200
   -17 RESERV/PKN,MXP,PCX,MXP,PCY,MXP,PCZ,MXP
   -18 MXWD2=24+4
   -19 CIMFIL/ON,MOVNRB
   -20   DMY=POSTF(20)
   -21   IW4=POSTF(7,4)
   -22   IF(IW4 .NE. (ICODEF(ON)))JUMPTO/LB80
   -23   KRD=POSTF(7,5)
   -24   KNT=POSTF(7,6)
   -25   KWT=POSTF(7,7)
   -26   KCP=POSTF(7,8)
   -27   IF(KNT.LT.2 .OR. KNT .GT. MXP) THEN
   -28     DMY=POSTF(13)
   -29     JUMPTO/LB90
   -30   ENDIF
   -31 $$ GET KNOTS
   -32   DMY=POSTF(14)
   -33   J1=4
   -34   DO/LB10,I1=1,KNT
   -35    IF(J1 .GE. MXWD2) THEN
   -36      DMY=POSTF(14)
   -37      J1=4
   -38    ENDIF
   -39    PKN(I1)=POSTF(7,(J1+1))
   -40    J1=J1+1
   -41  LB10)CONTIN
   -42 $$ NO WEIGHTS
   -43 $$ GET CONTRL POINTS
   -44   DMY=POSTF(14)
   -45   J1=4
```

```
-46    DO/LB20,I1=1,KCP
-47     IF(J1 .GE. MXWD2) THEN
-48       DMY=POSTF(14)
-49       J1=4
-50     ENDIF
-51     PCX(I1)=POSTF(7,(J1+1))
-52     PCY(I1)=POSTF(7,(J1+2))
-53     PCZ(I1)=POSTF(7,(J1+3))
-54     J1=J1+3
-55    LB20)CONTIN
-56   $$ FANUC FORMAT FOR A 4TH ORDER NURB IS:
-57   $$ G05 P10000
-58   $$ G06.2 P4 K1 CPX CPY CPZ
-59   $$ K2 CPX CPY CPZ
-60   $$ ...
-61   $$ KN-3
-62   $$ KN-2
-63   $$ KN-1
-64   $$ KN
-65    POSTN/ALL
-66    GOTO/PCX(1),PCY(1),PCZ(1)
-67    POSTN/OUT,7,5,16,10000
-68    POSTN/OUT,17,6.2,16,KRD,11,PKN(1),24,PCX(1),25,PCY(1),26,PCZ(1)
-69    PLABEL/OPTION,61,TO,10
-70    DO/LB30,I1=2,KCP
-71     DMY=POSTF(3,3,(355+11))
-72     POSTN/OUT,11,PKN(I1),24,PCX(I1),25,PCY(I1),26,PCZ(I1)
-73    LB30)CONTIN
-74    PLABEL/OPTION,61,TO,0
-75    I1=I1+1
-76    DO/LB30,J1=I1,KNT
-77     POSTN/OUT,11,PKN(J1)
-78    LB30)CONTIN
-79    POSTN/OUT,7,5,16,0
-80   $$ SKIP THE GOTO/PTS UNTIL MOVNRB/OFF
-81    DMY=POSTF(14)
-82    DMY=POSTF(20)
-83    IW4=POSTF(7,4)
-84    IF(IW4 .NE. (ICODEF(NEXT)))JUMPTO/LB80
-85    DO/LB40,I1=1,2
-86     I1=1
-87     DMY=POSTF(14)
-88     IW2=POSTF(7,2)
-89     IW3=POSTF(7,3)
-90     IF(IW2.EQ.2000 .AND. IW3.EQ.(ICODEF(MOVNRB)))I1=3
-91    LB40)CONTIN
```

```
      -92  JUMPTO/LB90
      -93  $$ MOVNRB/BAD
      -94  LB80)CONTIN
      -95  DMY=POSTF(21)
      -96  DMY=POSTF(13)
      -97  JUMPTO/LB90
      -98  LB90)CONTIN
      -99  CIMFIL/OFF
     -100  FINI
1
```

1 INTERCIM UNCX01 5.4.WN00 B- 3.0 MACHIN/UNCX01,11 DATE: 6/28/2000   PAGE 1
 FANUC 5-AXIS NURB
 NURB FIT   (INCH)
 INPUT CLREC N4G2Q24P5X34Y34R34Z34A43B33I34J34K34F32S5T2D2H2M2E2L4W32

```
    3     6 $ NURB FIT
    6    10 N1 M41$
    6    10 N2 S00300 M03$
   10    18 N3 G1 X.707 Y.0175 Z-.707 A90. B-0. F10.$      .7070    .0175    -.7070   90.000     .000
   10    18 N4 G5 P10000$
   10    18 N5 G6.2 P4 X.707 Y.0175 Z-.707 K0.$            .7070    .0175    -.7070
   10    18 N6 X.7041 Y.2559 Z-.7041 K0.$                  .7041    .2559    -.7041
   10    18 N7 X.5599 Y.7675 Z-.5599 K0.$                  .5599    .7675    -.5599
   10    18 N8 X.1975 Y1. Z-.1975 K0.$                     .1975   1.0000    -.1975
   10    18 N9 X0. Y1. Z0. K.4607$                         .0000   1.0000     .0000
   10    18 N10 K1.$
   10    18 N11 K1.$
   10    18 N12 K1.$
   10    18 N13 K1.$
   10    18 N14 G5 P0$
   10    26 N15 G1 X1. Y0. Z0. B45.$                      1.0000    .0000     .0000         45.000
  101    28 N16 M02$
  101    30 %$
0             TAPE    TIME   WARNING
        PAGE  2.06    .04      0
        TOTAL 2.06    .04      0
```

1 INTERCIM UNCX01 5.4.WN00 B- 3.0 MACHIN/UNCX01,11 DATE: 6/28/2000   PAGE 2
 FANUC 5-AXIS NURB
 NURB FIT   (INCH)
 INPUT CLREC N4G2Q24P5X34Y34R34Z34A43B33I34J34K34F32S5T2D2H2M2E2L4W32

	X-AXIS	Y-AXIS	Z-AXIS
POST-MINIMUM	.7070	.0000	-.7070
POST-MAXIMUM	10.0000	10.0000	30.0000
TAPE-MINIMUM	.0000	.0000	-.7070

TAPE-MAXIMUM   1.0000   1.0000   .0000

	A-AXIS	B-AXIS	C-AXIS
POST-MINIMUM	90.0000	.0000	.0000
POST-MAXIMUM	90.0000	45.0000	.0000
TAPE-MINIMUM	90.0000	.0000	.0000
TAPE-MAXIMUM	90.0000	45.0000	.0000

08:25:10 Completed Post UNCX01 ok