Plotc Quick Guide (2.6)

Default values are in ( )'s

Running Plotc

plotc [-a input8] [-b input9] [-o outps] [-g outdb] [-V] namelist

-a input8	Linked to Fortran unit 8
-b input9	Linked to Fortran unit 9
-o outps	PostScript output file (plotc.ps)
-g outdb	Debug output file (plotc.debug)
-V	Print version and usage info
namelist	Namelist input file

Namelist PTYPE

Curves and Symbols

NCURV	Number of curves (1) $> 0 \rightarrow$ use line style ICTYPE(1) for all $< 0 \rightarrow$ use different line styles
ICTYPE(i)	Line styles for curves: 1–5 $\rightarrow$ solid, short-dashed, dot-dashed, long-dashed, dotted. (1–5, then repeat)
CLRCRV(i)	Color name for curve i: BLACK, RED, GREEN, YELLOW, BLUE, MAGENTA, CYAN, or WHITE
RGBCRV(j,i)	RGB color values for curve i (black)
NSYMB	Number of symbol sets (0) $> 0 \rightarrow$ use symbol ISTYPE(1) for all sets $< 0 \rightarrow$ use different symbols
ISTYPE(i)	Symbol types for symbol sets: 1–10 $\rightarrow$ circle, square, triangle, diamond, inverted triangle, lower-right-quadrant circle, upper semicircle, rhombus, pentagon, and house. (1–10, then repeat)
CLRSYM(i)	Color name for symbol set i
RGBSYM(j,i)	RGB color values for symbol set i (black for first, RGBSYM(j,1) for rest)
ISIZE1(i)	Size of symbols for symbol sets (10)
IEBAR	0 No error bars (default) ± 1 Error bar lengths as fraction of y ± 2 Error bar lengths in user's units IEBAR $> 0 \rightarrow$ equal lengths above/below symbol, $< 0 \rightarrow$ different lengths
IMASK(1)	0 No masking behind symbols 1 Mask material behind symbols (default)
ITYPE	0 Plot curve data as vectors (default) 1 Plot curve data as points 2 Plot curve data as vector-symbol
IFREQ	Frequency for symbols in vector-symbol plot (10)
ISTYPV(i)	Symbol types for vector-symbol curves (1–10, then repeat)
ISIZE	Size of symbols for vector-symbol curves (10)
ICLIP	0 No clipping (default) 1 Clip curves and symbols at ends of axes
OFFSET	x-offset for curves (0.0)

Coordinate Definition Procedure

MODEC	0 Read x's then y's for curves, 8E10.0 (default) 1 Read y's, equally spaced x's for curves 2 Read x-y pairs for curves 3 Read x's then y's for curves 20 Read x's and y's for curves from table 30 Read x's and y's from Genplot file
IFILEC	0 Read curve data from namelist file (default) 1 Read curve data from separate file
FMTXYC	Format for reading curve data (*)
ISKIPC	Number of records to skip before curve data (0)
IREWC	0 No rewinding between curves (default) 1 Rewind file between curves
MODEP, IFILEP, FMTXYP, ISKIPP, IREWP	Same as above, for symbol sets
AXTR(i), BXTR(i)	a_x and b_x in $x_{plot} = a_x x + b_x$ (1.0,0.0)
AYTR(i), BYTR(i)	Same as above, for y_{plot}
NPLIM	Max number of points to use in defining a curve (NPMAX)
IREV	1 Switch x and y axes 0 No switching (default)

Plotting Frame

IROT	0 Portrait mode (default) 1 Landscape mode
XORGN, YORGN	Lower-left corner of plot, relative units (centered)
PGWID, PGHGT	Paper width and height, inches (8.5,11.0 for portrait; 11.0,8.5 for landscape)
FWID, FHGT	Frame width and height, relative units (8.5,11.0 for portrait; 11.0,8.5 for landscape)
CLRBK	Color name for background
RGBBK	RGB color values for background (white for OpenGL, none for PostScript)

Text String Characteristics

ITITLE(i)	Flag for titles on plot, x-axis, y-axis (0,1,1) 0 For no title 1 To include title ITITLE(1) $= 1 \rightarrow$ top of plot, $-1 \rightarrow$ top of frame
TALIGN(i)	Alignment of titles on plot, x-axis, y-axis (left,center,center)
FONTS(i)	Fonts for axis labels, titles, legend, text strings (H,H,H,H)
ISIZET	Size of characters in titles (18)
ISIZEL	Size of characters in labels (16)

Text Strings at Arbitrary Locations

NSTR	1 Locations in user's units (default) -1 Locations in relative units
XSTR(i), YSTR(i)	Locations of strings (0.0)
ASTR(i)	Contents of strings (blank)
ISIZES(i)	Size of characters in strings (12)
CLRSTR(i)	Color name for string i
RGBSTR(j,i)	RGB color values for string i (RGBXT(j) for first, RGBSTR(j,1) for rest)
SALIGN(i)	Alignment of strings (left)
IMASK(2)	0 No masking behind strings 1 Mask material behind strings (default)

Legend Table

ILEGND	0 No legend (default) ± 1 Standard two-column legend ± 2 Generalized legend Values $> 0 \rightarrow$ location in user's units, $< 0 \rightarrow$ relative units
XLEG, YLEG	Upper-left corner of table (fit in upper right corner of plot or frame)
NLEGC	Number of columns (2)
NLEGR	Number of rows
HDLEG(i)	Headers for columns (blank)
CLRLHD	Color name for header
RGBLHD	RGB color values for header (RGBXT)
ALEG(i,j)	Contents of row i, column j. Use \CRV$n$ or \SYM$n$ for curve or symbol set n. (blank)
CLRLTX(i)	Color name for text in row i
RGBLTX(j,i)	RGB color values for text in row i (RGBLHD)
ILCLR	1 Use curve/symbol color for text (0)
ISIZEG	Size of characters in legend (12)
ILEGBX	0 No box around legend (default) 1 Box with lines between columns -1 Box without lines between columns
CLRLBX	Color name for outlining box
RGBLBX	RGB color values for outlining box (RGBAX)
IMASK(3)	0 No masking behind legend 1 Mask material behind legend (default)

Output devices

IDEV	Output device, use sum for multiple devices (3) 1 Plot on monitor using OpenGL 2 PostScript

Debugging

IDEBUG(i)	Flags for debug printout (0)

Namelist AXES

ISCALE	0	Automatically scale both axes (default)
	1	Specify scales for both axes
	2	Specify x scales only
	3	Specify y scales only
	4	Same as 0, but with equal x and y increments
CLRAX		Color name for axes
RGBAX		RGB color values for axes (black)
XMIN, XMAX		Start and end value for x-axis, user's units (0.0,1.0)
YMIN, YMAX		Start and end value for y-axis, user's units (0.0,1.0)
NINTX, NINTY		Number of intervals for axes (5,5)
XLEN, YLEN		Length of axes, relative units (NINTX,NINTY)
XTITLE, YTITLE, PTITLE		Titles for x-axis, y-axis, and plot (blank)
CLRXT, CLRYT, CLRPT		Color names for titles
RGBXT, RGBYT, RGBPT		RGB color values for titles (RGBAX, RGBXT,RGBXT)
IXAXIS, IYAXIS	0	Axis without tick marks or grid lines
	1	Axis with inward tick marks (default)
	−1	Axis with outward tick marks
	2	Axis with grid lines
	3	No axis
TKLEN		Length of tick marks, relative units (0.1)
CLRGRD		Color name for tick marks/grid lines
RGBGRD		RGB color values for tick marks/grid lines (RGBAX)
GRAYGR		Lightness factor for grid lines (0.8)
IFRAME	0	No frame (default)
	1	Frame around plot
	2	Frame around plot, with tick marks
ILOGX, ILOGY	0	Standard axis (default)
	1	Logarithmic axis
INOTX, INOTY	0	Floating/fixed notation for labels (default)
	1	Scientific notation for labels
NLABX, NLABY		Number of labels for x and y axes (NINTX+1, NINTY+1)
CLRXLB, CLRYLB		Color names for labels
RGBXLB, RGBYLB		RGB color values for labels (RGBAX, RGBXLB)
XORGU, YORGU		Coordinates where axes cross, user's units (XMIN,YMIN)

Text String Features

Special Chars.	*nnn*, where *nnn* is three-digit octal code
Subscripts	\sub[whatever]
Superscripts	\sup[whatever]
Font change	\ft$x$ for one-character font names, \ft(xx for two-character font names

Fonts Available

H	Helvetica
HB	Helvetica Bold
HO	Helvetica Oblique
HD	Helvetica Bold Oblique
R	Times Roman
B	Times Bold
I	Times Italic
BI	Times Bold Italic
C	Courier
CB	Courier Bold
CO	Courier Oblique
CD	Courier Bold Oblique
S	Symbol

Debug Output

i	**Printout**
1	Namelist PTYPE and AXES input
2	Coordinates of each curve
3	Coordinates of IDEBUG(3)'th curve
4	Coordinates of each symbol set
5	Coordinates of IDEBUG(5)'th symbol set
6	Input to subroutines LABLGL and LABLPS
7	Input to subroutines PLOTGL and PLOTPS
8	Input to subroutines XAXGL and XAXPS
9	Input to subroutines YAXGL and YAXPS
11	Parameters used when OFFSET > 0

Standard COORS and POINTS Input

For MODEC $\neq 30$, titles appear once, everything else repeats NCURV/NSYMB times. Specify curve data first, then symbol set data. Error bar data only applies to symbol sets. Coordinates X(i) and Y(i) may be in namelist input file or separate file, depending on IFILEC/P. Everything else (titles, NP, etc.) is in namelist input file, after namelist AXES.

For all MODEC/P

XTITLE	Title for x-axis
YTITLE	Title for y-axis
PTITLE	Title for plot

MODEC/P = 0

NP	Number of points in curve/symbol set, I6
X(i)	x-coordinates, 8E10.0
Y(i)	y-coordinates, 8E10.0
YERR1(i)	Error bar lengths above symbols, 8E10.0 (IEBAR $\neq 0$)
YERR2(i)	Error bar lengths below symbols, 8E10.0 (IEBAR < 0)

MODEC/P = 1

NP	Number of points in curve/symbol set
X0, DX	Starting value x_0 and increment Δx
Y(i)	y-coordinates
YERR1(i)	Error bar lengths above symbols (IEBAR $\neq 0$)
YERR2(i)	Error bar lengths below symbols (IEBAR < 0)

MODEC/P = 2

NP	Number of points in curve/symbol set
X(i), Y(i)	x-y coordinate pairs
YERR1(i)	Error bar lengths above symbols (IEBAR $\neq 0$)
YERR2(i)	Error bar lengths below symbols (IEBAR < 0)

MODEC/P = 4

NP	Number of points in curve/symbol set
X(i)	x-coordinates
Y(i)	y-coordinates
YERR1(i)	Error bar lengths above symbols (IEBAR $\neq 0$)
YERR2(i)	Error bar lengths below symbols (IEBAR < 0)

MODEC/P = 20

NP	Number of points in curve/symbol set
ICOLX, ICOLY, ICOLE1, ICOLE2	Column numbers for x, y, and error bar data
TABLE(i,j)	Table of NP rows and up to 40 columns

MODEC = 30

Read coordinates X(i) and Y(i) from Genplot file.

User-Written COORS/POINTS Routines

Subroutine COORS is called once per curve, subroutine POINTS is called once per symbol set. ICURV and ISYMB are input parameters, rest are output parameters.

COORS (X,Y,NP,ICURV,XTITLE,YTITLE,PTITLE)

X	Array of x-coordinates
Y	Array of y-coordinates
NP	Number of points in curve
ICURV	Number of current curve
XTITLE	Title for x-axis
YTITLE	Title for y-axis
PTITLE	Title for plot

POINTS (X,Y,YERR1,YERR2,NP,ISYMB,ISIZED)

X	Array of x-coordinates
Y	Array of y-coordinates
YERR1	Error bar lengths above symbols
YERR2	Error bar lengths below symbols
NP	Number of points in symbol set
ISYMB	Number of current symbol set
ISIZED	Size of symbol

Octal Codes for Characters in the Standard Fonts

Code	*0*	*1*	*2*	*3*	*4*	*5*	*6*	*7*
00x								
01x								
02x								
03x								
04x		!	"	#	$	%	&	’
05x	(	)	*	+	,	-	.	/
06x	0	1	2	3	4	5	6	7
07x	8	9	:	;	<	=	>	?
10x	@	A	B	C	D	E	F	G
11x	H	I	J	K	L	M	N	O
12x	P	Q	R	S	T	U	V	W
13x	X	Y	Z	[	\	]	^	_
14x	‘	a	b	c	d	e	f	g
15x	h	i	j	k	l	m	n	o
16x	p	q	r	s	t	u	v	w
17x	x	y	z	{	|	}	~	
20x								
21x								
22x								
23x								
24x		¡	¢	£	⁄	¥	ƒ	§
25x	¤	'	“	«	‹	›	fi	fl
26x		–	†	‡	·		¶	•
27x	‚	„	”	»	…	‰		¿
30x		`	´	ˆ	˜	¯	˘	˙
31x	¨		°	¸		˝	˛	ˇ
32x	—							
33x								
34x		Æ		ª				
35x	Ł	Ø	Œ	º				
36x		æ				ı		
37x	ł	ø	œ	ß				

ASCII control character

not assigned

Octal Codes for Characters in the Symbol Font

Code	*0*	*1*	*2*	*3*	*4*	*5*	*6*	*7*
40x								
41x								
42x								
43x								
44x		!	∀	#	∃	%	&	∋
45x	(	)	*	+	,	−	.	/
46x	0	1	2	3	4	5	6	7
47x	8	9	:	;	<	=	>	?
50x	≅	Α	Β	Χ	Δ	Ε	Φ	Γ
51x	Η	Ι	ϑ	Κ	Λ	Μ	Ν	Ο
52x	Π	Θ	Ρ	Σ	Τ	Υ	ς	Ω
53x	Ξ	Ψ	Ζ	[	∴	]	⊥	_
54x	‾	α	β	χ	δ	ε	φ	γ
55x	η	ι	φ	κ	λ	μ	ν	ο
56x	π	θ	ρ	σ	τ	υ		ω
57x	ξ	ψ	ζ	{	|	}	~	
60x								
61x								
62x								
63x								
64x				≤	⁄	∞	ƒ	♣
65x	♦	♥	♠	↔	←	↑	→	↓
66x	°	±		≥	×	∝	∂	•
67x	÷	≠	≡	≈	…	|	—	↵
70x	ℵ	ℑ	ℜ	℘	⊗	⊕	∅	∩
71x	∪	⊃	⊇	⊄	⊂	⊆	∈	∉
72x	∠	∇	®	©	™	∏	√	·
73x	¬	∧	∨	⇔	⇐	⇑	⇒	⇓
74x	◊	〈	®	©	™	∑	⎛	⎜
75x	⎝	⎡	⎢	⎣	⎧	⎨	⎩	⎪
76x		〉	⎮	⎮	⎜	⎭	⎫	⎪
77x	⎭	⎤	⎥	⎦	⎫	⎬	⎭	

ASCII control character

not assigned

Running Plotc_p3d

plotc_p3d [-b input9] [-o outps] [-g outdb] [-t tfile] [-f u|b|f] [-r w|p|2] [-i] [-V] namelist

-b input9	Linked to Fortran unit 9
-o outps	PostScript output file (plotc_p3d.ps)
-g outdb	Debug output file (plotc_p3d.debug)
-t tfile	Turbulence data file
-f u|b|f	File format for xyz, q, and turbulence data file: u for unformatted, b for binary, f for formatted (b)
-r w|p|2	Record format for xyz, q, and turbulence data file: w for 3-D whole, p for 3-D planes, 2 for 2-D (w)
-i	xyz file includes IBLANK array
-V	Print version and usage info
xyzfile	Plot3d xyz file
qfile	Plot3d q file
namelist	Namelist input file

Namelist P3D

IFCT	Number of function to be plotted (13)
IABSC	Abscissa for the plot
	1 Cartesian coordinate, x
	2 Cartesian coordinate, y
	3 Cartesian coordinate, z
	4 Index along the specified grid line
	5 Distance along the specified grid line (default)
	$-n$ Function number n
IDIR	Direction of the grid line(s) of interest
	1 ξ direction (default)
	2 η direction
	3 ζ direction
IND	Indices of grid line(s) of interest (1,1,98*0 for 3-D; 1,99*0 for 2-D)
INEAR	Wall location. Only needed for functions 108, 109.
	1 Wall at $\xi = 0$
	2 Wall at $\xi = 1$
	3 Wall at $\eta = 0$ (default)
	4 Wall at $\eta = 1$
	5 Wall at $\zeta = 0$
	6 Wall at $\zeta = 1$
IBLOCK	Block number for multi-block files (single-block)

Functions Available with Plotc_p3d

For turbulent flow, numbers 100–107 and 120–128 require "-t tfile" option with plotc_p3d. See the plotc manual.

Number	Variable Plotted
1	x-velocity, u
2	y-velocity, v
3	z-velocity, w
4	Mach number, $M = \lvert\vec{V}\rvert/a$
5	Speed of sound, $a = \sqrt{\gamma RT}$
6	Contravariant velocity, U
7	Contravariant velocity, V
8	Contravariant velocity, W
9	Velocity magnitude, $\lvert\vec{V}\rvert = (u^2 + v^2 + w^2)^{1/2}$
10	x-momentum, ρu
11	y-momentum, ρv
12	z-momentum, ρw
13	ξ-velocity, $V_\xi = (x_\xi u + y_\xi v + z_\xi w)/(x_\xi^2 + y_\xi^2 + z_\xi^2)^{1/2}$
14	η-velocity, $V_\eta = (x_\eta u + y_\eta v + z_\eta w)/(x_\eta^2 + y_\eta^2 + z_\eta^2)^{1/2}$
15	ζ-velocity, $V_\zeta = (x_\zeta u + y_\zeta v + z_\zeta w)/(x_\zeta^2 + y_\zeta^2 + z_\zeta^2)^{1/2}$
16	Flow angle, $\alpha_v = \tan^{-1}(v/u)$
17	Flow angle, $\alpha_w = \tan^{-1}(w/u)$
20	Static density, ρ
21	Total density, $\rho_T = \rho[1 + (\gamma - 1)M^2/2]^{1/(\gamma-1)}$
30	Static pressure, p
31	Total pressure, $p_T = p[1 + (\gamma - 1)M^2/2]^{\gamma/(\gamma-1)}$
32	Static pressure coefficient, $c_p = (\bar{p} - p_r)/(\rho_r u_r^2/2g_c)$
33	Total pressure coefficient, $c_{p_T} = (\bar{p}_T - p_{T_r})/(\rho_r u_r^2/2g_c)$
34	Pitot pressure, p_p
35	Dynamic pressure, $(\rho/2)(u^2 + v^2 + w^2)\rho_r u_r^2/g_c p_r$
40	Static temperature, T
41	Total temperature, $T_T = T[1 + (\gamma - 1)M^2/2]$
50	Total energy per unit volume, E_T
51	Total energy, E_T/ρ
52	Internal energy, $e_i = c_v T$
53	Kinetic energy, $e_k = (u^2 + v^2 + w^2)/2$
60	Static enthalpy, $h = c_p T$
61	Total enthalpy, $h_T = c_p T_T$
70	x-vorticity, $\Omega_x = \partial w/\partial y - \partial v/\partial z$
71	y-vorticity, $\Omega_y = \partial u/\partial z - \partial w/\partial x$
72	z-vorticity, $\Omega_z = \partial v/\partial x - \partial u/\partial y$
73	Vorticity magnitude, $\lvert\vec{\Omega}\rvert = (\Omega_x^2 + \Omega_y^2 + \Omega_z^2)^{1/2}$
80	Entropy, $s = c_v \ln p - c_p \ln \rho$
90	Laminar viscosity, μ_l
91	Laminar second coefficient of viscosity, $\lambda_l = -2\mu_l/3$
92	Laminar thermal conductivity, k_l
93	Specific heat at constant pressure, c_p
94	Specific heat at constant volume, c_v
95	Ratio of specific heats, $\gamma = c_p/c_v$
100	Turbulent viscosity, μ_t
101	Turbulent second coefficient of viscosity, $\lambda_t = -2\mu_t/3$
102	Turbulent thermal conductivity, $k_t = (\bar{c}_p \bar{\mu}_t/Pr_t)/k_r$
103	Effective viscosity, μ
104	Effective second coefficient of viscosity, λ
105	Effective thermal conductivity, k
106	Turbulent kinetic energy, k
107	Turbulent dissipation rate, ϵ
108	Inner region coordinate, $y^+ = Re_r M_r \rho_w u_\tau y_n/\mu_w$
109	Inner region velocity, $u^+ = \lvert\vec{V}\rvert/u_\tau = \lvert\vec{V}\rvert(\mu\lvert\vec{\Omega}\rvert/\rho Re_r M_r)_w^{-1/2}$
120	Shear stress, τ_{xx}
121	Shear stress, τ_{yy}
122	Shear stress, τ_{zz}
123	Shear stress, τ_{xy}
124	Shear stress, τ_{xz}
125	Shear stress, τ_{yz}
126	Heat flux, q_x
127	Heat flux, q_y
128	Heat flux, q_z
200	Cartesian coordinate, x
201	Cartesian coordinate, y
202	Cartesian coordinate, z
210	Inverse Jacobian, J^{-1}
211	Metric coefficient, ξ_t
212	Metric coefficient, ξ_x
213	Metric coefficient, ξ_y
214	Metric coefficient, ξ_z
215	Metric coefficient, η_t
216	Metric coefficient, η_x
217	Metric coefficient, η_y
218	Metric coefficient, η_z
219	Metric coefficient, ζ_t
220	Metric coefficient, ζ_x
221	Metric coefficient, ζ_y
222	Metric coefficient, ζ_z