

自动绘图程序设计参考

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目 3 录

第六章： HT / 121 A 绘图程序系统

1—1—1	1
1—2—1	7
1—3—1	9
2—1—1	12
2—2—1	19
2—3—1	24
3—1—1	32
3—2—1	43
3—3—1	46
3—4—1	49
4—1—1	53
5—1—1	56
5—2—1	78
用 HT / 121 A 编绘图程序的例子	92
几何等距线，汉字、字符产生和绘图后置处理程序	
(1) 汉字及对应编号表	98
(2) 写单个汉字的程序	100
(3) 写绘图机允许字符	115
(4) 绘图系统开始	118
(5) 绘图系统结束	120
(6) 输出绘图信息	122
(7) 输出处理	127
(8) 类型转换	129
(9) 换码	130
(10) 打印	131
(11) 空带	132
(12) 绘几何图形等距线	132
(13) 后置示例	137

空间曲线光顺程序

(1) 对三维坐标点列进行光顺	147
(2) 求切矢	153
(3) 求线段与 X 轴夹角	154
(4) 求得空间矢量	155
(5) 求曲率	155
(6) 追赶法解三对角线性方程组	156

第六章 HT / 121 A 绘图程序系统

1—1—1*

```
'PROC' STR(KP);  
'VALUE' KP;'INTEG' KP;  
'BEGIN"INTEG' I;'SWITCH' S: = L1, L2;  
KP: = 1 + ABS(KP);  
'IF' KP = 1 'OR' KP = 2 'THEN'  
'BEGIN"FOR' I: = 1 'STEP' 1 'UNTIL' 100 'DO'  
WRITE(-1, ".", 0);  
'END" ELSE'  
'BEGIN"FOR' I: = 1 'STEP' 1 'UNTIL' KP - 1  
'DO' WRITE(-1, ".", 0);  
'GOTO' L11 'END';  
'GOTO' S[KP];  
L1: WRITE(-1, ":", 0);  
'GOTO' L10;  
L2: WRITE(-1, " = ", 0);  
L10: DCXC(1, 6, "PROGRAM - START", 0, 1);  
L11: 'END';
```

1—1—2*

```
'PROC' MMMM(KP);  
'VALUE' KP;'INTEG' KP;  
'BEGIN"INTEG' I;  
'SWITCH' S: = L1, L2, L3, L4;  
KP: = 1 + ABS(KP);  
'GOTO' S[KP];  
L1: WRITE(-1, " M00:", 0);  
'GOTO' L5;  
L2: WRITE(-1, " M01:", 0);  
'GOTO' L5;  
L3: WRITE(-1, " M02:", 0);  
'GOTO' L5;
```

注: 1. *表示增编程序。

2. **表示对原程序^[15]有改动或仅保留原名。

3. 本章各程序编号参见第五章目录。

```

L4: WRITE (-1, " M30;", 0);
L5: 'FOR' I = 1 'STEP' 1 'UNTIL' 200 'DO'
WRITE (-1, " ", 0);
DCXC (1, 6, " PROGRAM-STOP", 0, 1);
'END';

```

1—1—3*

```

'PROC' ROUND(DATT, DA);
'VALUE' DATT; 'REAL' DATT, DA;
'BEGIN'
JUMP (2, L10);
'IF' ABS(DATT) 'LQ'  $10^{-4}$  'THEN'
'BEGIN' DA = 0; 'GOTO' L300 'END';
DA = DATT // 0.01;
'GOTO' L300;
L10: 'IF' ABS(DATT) 'LQ'  $10^{-5}$  'THEN'
'BEGIN' DA = 0; 'GOTO' L300 'END';
DA = DATT // 0.005 ↑ 5;
L300: 'END';

```

1—1—4*

```

'PROC' PLOT(X, Y, N);
'VALUE' X, Y, N; 'INTEG' N;
'REAL' X, Y;
'BEGIN' 'REAL' XX, YY;
'IF' ABS(X) 'GQ'  $10^6$  'OR' ABS(Y) 'GQ'  $10^6$ 
'THEN' 'BEGIN' DCXC (1, 6, " PLOT - 'GQ'  $10^6$ ", 0, 1);
'GOTO' L4; 'END';
ROUND(X, XX); ROUND(Y, YY);
JUMP (2, L10);
'IF' N = 0 'THEN' 'GOTO' L1 'ELSE' 'IF'
N = 1 'THEN' WRITE (-1, " D1; G1", 0) 'ELSE'
WRITE (-1, " D2; G1", 0);
L1: 'IF' ABS(XX) 'LQ'  $10^{-5}$  'THEN'
WRITE(0, " X", 1) 'ELSE' WRITE(0, " X", XX);
'IF' ABS(YY) 'LQ'  $10^{-5}$  'THEN'
WRITE(0, " Y", 1) 'ELSE' WRITE(0, " Y", YY);
'GOTO' L11;
L10: 'IF' XX = 0 'AND' YY = 0 'THEN' 'GOTO' L4;
'IF' XX 'NQ' 0 'THEN' WRITE(0, " X", XX);
'IF' YY 'NQ' 0 'THEN' WRITE(0, " Y", YY);
L11: WRITE (-1, " ", 0);
L4: 'END';

```

1—1—5*

```
'PROC' LINE1(XS,YS,XF,YF,KP);  
'VALUE' XS,YS,XF,YF,KP;  
'INTEG' KP;  
'REAL' XS,YS,XF,YF;  
'BEGIN''REAL' X,Y;  
JUMP(2,L10);  
'IF' KP'NQ'0'THEN' PLOT(XS,YS,2)'ELSE' PLOT(XS,YS,1);  
PLOT(XF,YF,1);'GOTO' L99;  
L10: X = XF - XS; Y = YF - YS;  
'IF' KP'NQ'0'THEN'  
PLOT(X,Y,2)'ELSE' PLOT(X,Y,1);  
L99:'END';
```

1—1—6*

```
'PROC' ARC1(XS,YS,XF,YF,XC,YC,NCW);  
'VALUE' XS,YS,XF,YF,XC,YC,NCW;  
'INTEG' NCW;'REAL' XS,YS,XF,YF,XC,YC;  
'BEGIN''INTEG' N;  
'REAL' II,JJ,I,J,DX,DY,RS,RF,X,Y;  
II = XC - XS; JJ = YC - YS;  
DX = XF - XS; DY = YF - YS;  
RS = GN2(II↑II + JJ↑JJ);  
RF = GN2((XF - XC)↑↑2 + (YF - YC)↑↑2);  
'IF' ABS(RS - RF)'GQ'0.1'THEN''BEGIN'  
DCXC(1,6,"ARC1 - RS'NQ'RF",0,1);PLOT(XF,YF,2);  
'GOTO' L100;'END';  
ROUND(II,I);ROUND(JJ,J);  
'IF' NCW'LQ'2'THEN''BEGIN' N:  
= NCW; PLOT(XS,YS,1);'END''ELSE''BEGIN'  
N = NCW - 2; PLOT(XS,YS,2);'END';  
JUMP(2,L10);  
'IF' N = 1'THEN' WRITE(-1,"D1;G2",0)  
'ELSE''IF' N = 2'THEN' WRITE(-1,"D1;G3",0);  
ROUND(XF,X);ROUND(YF,Y);  
'IF' ABS(X)'LQ'10-5'THEN'  
WRITE(0,"X",1)'ELSE' WRITE(0,"X",X);  
'IF' ABS(Y)'LQ'10-5'THEN'  
WRITE(0,"Y",1)'ELSE' WRITE(0,"Y",Y);  
'IF' ABS(I)'LQ'10-5'THEN'  
WRITE(0,"I",1)'ELSE' WRITE(0,"I",I);  
'IF' ABS(J)'LQ'10-5'THEN'  
WRITE(0,"J",1)'ELSE' WRITE(0,"J",J);
```

```

'GOTO' L11;
L10: ROUND(DX, X);
ROUND(DY, Y);
'IF' N = 1 'THEN' WRITE(- 1, "G2", 0)
'ELSE' 'IF' N = 2 'THEN' WRITE(- 1, "G3", 0);
'IF' X'NQ'0' THEN' WRITE(0, "X", X);
'IF' Y'NQ'0' THEN' WRITE(0, "Y", Y);
'IF' I'NQ'0' THEN' WRITE(0, "I", I);
'IF' J'NQ'0' THEN' WRITE(0, "J", J);
L11: WRITE(- 1, ";", 0);
L100: 'END';

```

1—1—7*

```

'PROC' CIRC1(X, Y, D);
'VALUE' X, Y, D; 'REAL' X, Y, D;
'BEGIN' "REAL' XX, YY, DD;
PLOT(X - ABS(D), Y, 2);
ROUND(X - ABS(D); XX);
ROUND(Y, YY);
ROUND(ABS(D), DD);
WRITE(- 1, "D1;G2", 0);
'IF' XX'NQ'0' THEN' WRITE(0, "X", XX);
'IF' YY'NQ'0' THEN' WRITE(0, "Y", YY);
WRITE(0, "I", DD);
WRITE(- 1, ";", 0);
'END';

```

1—1—8

```

'PROC' CIRC2(X1, Y1, X2, Y2, X3, Y3);
'VALUE' X1, Y1, X2, Y2, X3, Y3;
'REAL' X1, Y1, X2, Y2, X3, Y3;
'BEGIN' "INTEG' IER;
'REAL' A, B, XA, YA, E, F, G, H, R, C, D;
A = (Y1 + Y2)/2; B = (X1 + X2)/2;
C = (X2 + X3)/2; D = (Y2 + Y3)/2;
'IF' ABS(X2 - X1)'LS' 10-5 'THEN' "GOTO' L100;
'IF' ABS(X2 - X3)'LS' 10-5 'THEN' "GOTO' L200;
'GOTO' L100;
L100: YA = A;
'IF' ABS(X2 - X3)'LS' 10-5 'THEN' "GOTO' L101;
'IF' ABS(Y2 - Y3)'LS' 10-5 'THEN' "GOTO' L101;
XA = ((Y3 - Y2)/(X3 - X2))↑ (D - A) + C;
'GOTO' L200;

```

```

L101:XA: = C;'GOTO' L2000;
L200:YA: = D;'IF' ABS(X1 - X2)'LS' 10-5
'THEN' 'GOTO' L201;
XA: = ((Y2 - Y1)/(X2 - X1))↑ (A - D) + B;
'GOTO' L2000;
L201:XA: = B;'GOTO' L2000;
L1000:G: = (Y2 - Y1)/(X2 - X1);
H: = (Y3 - Y2)/(X3 - X2);
E: = B + G↑ A;
F: = C + H↑ D;
XA: = (E↑ H - F↑ G)/(H - G);
YA: = (F - E)/(H - G);
L2000:R: = GN2((XA - X1)↑↑ 2 + (YA - Y1)↑↑ 2);
CIRC1(XA,YA,R);
'END';

```

1—1—9

```

'PROC' ARC2(X1,Y1,X2,Y2,X3,Y3);
'VALUE' X1,Y1,X2,Y2,X3,Y3;
'REAL' X1,Y1,X2,Y2,X3,Y3;
'BEGIN' 'INTEG' NCW;
'REAL' A,B,C,D,YA,XA,G,H,E,F,
DD,FCOS,FSIN,YY;
A: = (Y1 + Y2)/2;
B: = (X2 + X1)/2;
C: = (X2 + X3)/2;
D: = (Y2 + Y3)/2;
'IF' ABS(X1 - X2)'LS' 10-6'AND'
ABS(X2 - X3)'LS' 10-6'THEN'
'GOTO' L300;
'IF' ABS(X2 - X1)'LS' 10-6'THEN'
'GOTO' L100;
'IF' ABS(X2 - X3)'LS' 10-6'THEN'
'GOTO' L200;
'GOTO' L1000;
L100:YA: = A;
'IF' ABS(Y2 - Y3)'LS' 10-6'THEN'
'GOTO' L101;
XA: = ((Y3 - Y2)/(X3 - X2))↑ (D - A) + C;
'GOTO' L2000;
L101:XA: = C;'GOTO' L2000;
L200:YA: = D;
'IF' ABS(Y1 - Y2)'LS' 10-6'THEN' 'GOTO' L201;

```



```

XA: = ((Y2 - Y1)/(X2 - X1))↑ (A - D) + B;
'GOTO' L2000;
L201: XA: = B; 'GOTO' L2000;
L1000: G: = (Y2 - Y1)/(X2 - X1);
H: = (Y3 - Y2)/(X3 - X2);
'IF' ABS(H - G)'LS' 10-6' THEN "GOTO' L300;
E: = B + G↑ A;
F: = C + H↑ D;
XA: = (E↑ H - F↑ G)/(H - G);
YA: = (F - E)/(H - G);
L2000: DD: = GN2((X2 - X1)↑↑ 2 + (Y2 - Y1)↑↑ 2);
'IF' DD'LS' 10-6' THEN "GOTO' L300;
FCOS: = (X2 - X1)/DD;
FSIN: = (Y2 - Y1)/DD;
YY: = (Y3 - Y1)↑ FCOS - (X3 - X1)↑ FSIN;
'IF' ABS(YY)'LS' 10-5' THEN "GOTO' L300;
'IF' YY'LS' 10-5' THEN 'NCW: = 3;
'GOTO' L99;
'IF' YY'GR' 10-5' THEN 'NCW: = 4;
L99: ARC1(X1, Y1, X3, Y3, XA, YA, NCW);
'GOTO' L999;
L300: LINE1(X1, Y1, X2, Y2, 1);
LINE1(X2, Y2, X3, Y3, 1);
L999: 'END';

```

1—1—10*

```

'PROC' ARC3(XS, YS, XE, YE, R, L, K);
'VALUE' XS, YS, XE, YE, R, L, K;
'INTEG' K, L; 'REAL' XS, YS, XE, YE, R;
'BEGIN' 'INTEG' NCW;
'REAL' D, FC, FS, XXC, YYC, XC, YC;
'IF' R'GQ' 0' THEN 'NCW: = 1' ELSE 'NCW: = 2;
D: = GN2((XS - XE)↑ (XS - XE) + (YS - YE)↑ (YS - YE));
'IF' D'LS' 10-4' THEN "GOTO' L399;
'IF' ABS(2↑ R)'GQ' D' THEN "GOTO' L304;
L399: JUMP(3, L303);
DCXC(1, 6, "ARC3 - ERROR - D = ", D, 0);
L303: 'GOTO' L305;
L304: FC: = (XE - XS)/D;
FS: = (YE - YS)/D;
XXC: = D/2;
YYC: = GN2(R↑ R - XXC↑ XXC);
'IF' L = 1' AND 'NCW = 2' THEN 'YYC: = - YYC;

```

```

'IF 'L = 0' AND 'NCW = 1' THEN 'YYC: = - YYC;
XC: = XXC↑FC - YYC↑FS + XS;
YC: = XXC↑FS + YYC↑FC + YS;
'IF 'K = 0' THEN "GOTO 'L307;
NCW: = NCW + 2;
L307: ARC1(XS, YS, XE, YE, XC, YC, NCW);
L305: 'END';

```

1—1—11

```

'PROC' ARC4(XS, YS, A1, A2, R);
'VALUE' XS, YS, A1, A2, R;
'REAL' XS, YS, A1, A2, R;
'BEGIN' "INTEG' NCW;
'REAL' RAD1, RAD2, XC, YC, XF, YF;
RAD1: = A1↑0.01745329;
RAD2: = A2↑0.01745329;
XC: = XS - R↑COS(RAD1);
YC: = YS - R↑SIN(RAD1);
XF: = XC + R↑COS(RAD2);
YF: = YC + R↑SIN(RAD2);
'IF 'A1'LS'0' THEN "GOTO 'L501' ELSE'
'IF 'A1'GR'0' THEN "GOTO 'L502;
'IF 'A2'GQ'0' THEN "GOTO 'L502;
L501: NCW: = 3; 'GOTO 'L600;
L502: NCW: = 4;
L600: ARC1(XS, YS, XF, YF, XC, YC, NCW); 'END';

```

1—2—1*

```

'PROC' CLINE(K, U, V, W);
'VALUE' K, U, V, W;
'INTEG' K;
'REAL' U, V, W;
'BEGIN'
'SWITCH' T: = L1, L2, L3;
'IF 'K'LS'1' OR 'K'GR'3' THEN'
'BEGIN' WRITE(-1, "D07;", 0);
'GOTO 'L4; 'END';
U: = U↑100; V: = V↑100; W: = W↑100;
'IF 'K = 1' THEN "BEGIN'
WRITE(0, "D08U", U);
WRITE(0, "V", V); 'END' ELSE'
'BEGIN' WRITE(0, "D09U", U);
WRITE(0, "V", V);

```

```

WRITE(0,"W",W);'END';
WRITE(-1,"",0);
'GOTO'T[K];
L1: WRITE(-1,"D04;",0);'GOTO'L4;
L2: WRITE(-1,"D05;",0);
'GOTO'L4;
L3: WRITE(-1,"D06;",0);
L4:'END';

```

1—2—2*

```

'PROC'LINE2(K,XS,YS,XF,YF,U,V,W);
'VALUE'K,XS,YS,XF,YF,U,V,W;
'INTEG'K;
'REAL'XS,YS,XF,YF,U,V,W;
'BEGIN'
CLINE(K,U,V,W);
LINE1(XS,YS,XF,YF,1);
CLINE(0,U,V,W);
'END';

```

1—2—3*

```

'PROC'CLRC1(XC,YC,R,K,U,V,W);
'VALUE'XC,YC,R,K,U,V,W;
'INTEG'K;
'REAL'XC,YC,R,U,V,W;
'BEGIN'
CLINE(K,U,V,W);
CIRC1(XC,YC,R);
CLINE(0,U,V,W);
'END';

```

1—2—4*

```

'PROC'CLRC2(XS,YS,XF,YF,XC,YC,NCW,K,U,V);
'VALUE'XS,YS,XF,YF,XC,YC,NCW,K,U,V;
'INTEG'NCW,K;
'REAL'XS,YS,XF,YF,XC,YC,U,V;
'BEGIN'
'IF'NCW'LS'3'THEN'NCW:=NCW+2;
CLINE(K,U,V,V);
ARC1(XS,YS,XF,YF,XC,YC,NCW);
CLINE(0,U,V,V);
'END';

```

1—3—1*

```
'PROC' D345R(X,Y,ANGL);  
'VALUE' X,Y,ANGL;  
'REAL' X,Y,ANGL;  
'BEGIN" REAL' AN;  
PLOT(X,Y,2);  
WRITE(-1,"M02;.....",0);  
'IF' ANGL = 0' THEN" BEGIN'  
WRITE(0,"D19R",1);  
WRITE(-1,";",0);  
WRITE(0,"D28R",1);  
WRITE(-1,";",0);'GOTO' L99;'END';  
ROUND(ANGL,AN);  
AN:= ABS(AN);  
'IF' ANGL' LS' 0' THEN" BEGIN'  
WRITE(0,"D20R",AN);  
WRITE(-1,";",0);  
WRITE(0,"D29R",AN);  
WRITE(-1,";",0);  
'END" ELSE" BEGIN'  
WRITE(0,"D19R",AN);  
WRITE(-1,";",0);  
WRITE(0,"D28R",AN);  
WRITE(-1,";",0);  
'END';  
L99: WRITE(-1,".....",0);  
'END';
```

1—3—2*

```
'PROC' D1920R(X,Y,ANGL);  
'VALUE' X,Y,ANGL;  
'REAL' X,Y,ANGL;  
'BEGIN" REAL' AN;  
PLOT(X,Y,2);  
'IF' ANGL = 0' THEN" BEGIN'  
WRITE(0,"D19R",1);  
WRITE(-1,";",0);  
'GOTO' L99;'END';  
ROUND(ANGL,AN);  
'IF' ANGL' LS' 0' THEN' WRITE(0,"D20R",AN)' ELSE'  
WRITE(0,"D19R",AN);  
WRITE(-1,";",0);  
L99:'END';
```

1—3—3*

```
'PROC' D289R (X, Y, ANGL);  
'VALUE' X, Y, ANGL;  
'REAL' X, Y, ANGL;  
'BEGIN" REAL' AN;  
PLOT(X, Y, 2);  
'IF' ANGL = 0' THEN" BEGIN'  
WRITE(0, "D28R", 1);  
WRITE(-1, ",", 0);  
'GOTO' L99;  
'END';  
ROUND(ANGL, AN);  
'IF' ANGL' LS' 0' THEN'  
WRITE(0, "D29R", AN)' ELSE '  
WRITE(0, "D28R", AN);  
WRITE(-1, ",", 0);  
L99: 'END';
```

1—3—4*

```
'PROC' D1345R (SCAL, IP);  
'VALUE' SCAL, IP;  
'INTEG' IP;  
'REAL' SCAL;  
'BEGIN" REAL' SC;  
'SWITCH' T: = L1, L2, L3;  
'IF' SCAL = 0' THEN' SCAL: = 1;  
'IF' IP' LS' 1' OR' IP' GR' 3' THEN' IP: = 2;  
ROUND(SCAL, SC);  
SC: = SC  $\uparrow$  103;  
'GOTO' T[IP];  
L1: WRITE(0, "D14R", SC);  
'GOTO' L4;  
L2: WRITE(0, "D13R", SC);  
'GOTO' L4;  
L3: WRITE(0, "D15R", SC);  
L4: WRITE(-1, ",", 0);  
'END';
```

1—3—5*

```
'PROC' DSPEED (F);  
'VALUE' F;  
'INTEG' F;  
'BEGIN" REAL' FA;
```

```
'IF 'F' LQ '0' OR 'F' GR '19200
'THEN "GOTO' L99;
ROUND(F / 100, FA);
WRITE(0, "F", FA);
WRITE(-1, ",", 0);
L99: 'END';
```

1—3—6*

```
'PROC' SEQNO(N);
'VALUE' N; 'INTEG' N;
WRITE(0, ";", N", N // 1);
```

1—3—7*

```
'PROC' IORA(N);
'VALUE' N; 'INTEG' N;
'IF' N = 0 'THEN' WRITE(-1, "G04;", 0)
'ELSE' WRITE(-1, "G06;", 0);
```

1—3—8*

```
'PROC' PEN(K);
'VALUE' K; 'INTEG' K;
'BEGIN'
'SWITCH' T: = L1, L2, L3, L4;
'IF' K 'LS' 1 'OR' K 'GR' 4 'THEN' K: = 1;
'GOTO' T[K];
L1: WRITE(-1, "D21;", 0); 'GOTO' L5;
L2: WRITE(-1, "D22;", 0); 'GOTO' L5;
L3: WRITE(-1, "D23;", 0); 'GOTO' L5;
L4: WRITE(-1, "D24;", 0);
L5: 'END';
```

1—3—9*

```
'PROC' ZERO(N);
'VALUE' N;
'INTEG' N;
'BEGIN' 'INTEG' I;
'IF' N 'LQ' 0 'THEN' "GOTO' L99;
'FOR' I: = 1 'STEP' 1 'UNTIL' N 'DO'
WRITE(-1, ".", 0);
L99: 'END';
```

1—3—10*

```
'PROC' BLDEL(K);
```

```

'VALUE' K;
'INTEG' K;
'BEGIN'
'IF' K = 0' THEN "GOTO' L99' ELSE'
WRITE( - 1, " ; / ", 0);
L99; 'END';

```

1—3—11*

```

'PROC' DD12(K);
'VALUE' K; 'INTEG' K;
'BEGIN'
'IF' K 'GR' 2' OR 'K' 'LQ' 0' THEN 'K: = 2;
'IF' K = 1' THEN 'WRITE( - 1, " D1; ", 0);
'IF' K = 2' THEN 'WRITE( - 1, " D2; ", 0);
'END';

```

1—3—12*

```

'PROC' ESCC(K);
'VALUE' K; 'INTEG' K;
'IF' K = 0' THEN 'WRITE( - 1, " = ; ", 0);

```

1—3—13*

```

'PROC' M3CODE(K);
'VALUE' K; 'INTEG' K;
'IF' K = 0' THEN 'WRITE( - 1, " M30; ", 0);

```

2—1—1

```

'PROC' SYMET1(X1, Y1, XX, YY, K);
'VALUE' X1, Y1, K; 'INTEG' K;
'REAL' X1, Y1, XX, YY;
'BEGIN' 'IF' K = 1' THEN'
'BEGIN' XX: = - X1; YY: = - Y1; 'END'
'ELSE' 'IF' K = 2' THEN "BEGIN'
XX: = X1; YY: = - Y1; 'END' ELSE'
'BEGIN' XX: = - X1; YY: = Y1; 'END';
'END';

```

2—1—2

```

'PROC' SYMET2(X1, Y1, X2, Y2, XX, YY);
'VALUE' X1, Y1, X2, Y2;
'REAL' X1, Y1, X2, Y2, XX, YY;
'BEGIN' XX: = 2 ↑ X2 - X1;
YY: = 2 ↑ Y2 - Y1; 'END';

```

2—1—3

```
'PROC' SYMET3(X1, Y1, A, B, C, XX, YY);
'VALUE' X1, Y1, A, B, C;
'REAL' X1, Y1, A, B, C, XX, YY;
'BEGIN' "REAL' D, E;
D = A↑↑2 + B↑↑2; E = A↑↑2 - B↑↑2;
XX = (-2↑C↑A - E↑X1 - 2↑A↑B↑Y1)/D;
YY = (-2↑B↑C - 2↑A↑B↑X1 + E↑Y1)/D;
'END';
```

2—1—4

```
'PROC' DIVID(X1, Y1, X2, Y2, A, B, XX, YY, K);
'VALUE' X1, Y1, X2, Y2, A, B, K;
'INTEG' K; 'REAL' X1, Y1, X2, Y2, A, B, XX, YY;
'BEGIN' IF 'K = 1' THEN "GOTO' L2;
'IF' ABS(A - B) 'GQ' 10-5 THEN "BEGIN'
B = -B; 'GOTO' L2' END'
'ELSE' "BEGIN' XX = X2;
YY = Y2; 'END'; 'GOTO' L3;
L2: XX = (A↑X2 + B↑X1)/(A + B);
YY = (A↑Y2 + B↑Y1)/(A + B);
L3: 'END';
```

2—1—5*

```
'PROC' DIVID1(X1, Y1, X2, Y2, A, XX, YY);
'VALUE' X1, Y1, X2, Y2, A;
'REAL' X1, Y1, X2, Y2, A, XX, YY;
'BEGIN' "REAL' D;
D = GN2((X1 - X2)↑↑2 + (Y1 - Y2)↑↑2);
'IF' ABS(D) 'LS' 10-5 THEN "BEGIN'
DCXC(1, 6, "DIVID1 - ERROR", 0, 1);
'GOTO' L99; 'END';
XX = A/D↑(X2 - X1) + X1;
YY = A/D↑(Y2 - Y1) + Y1;
L99: 'END';
```

2—1—6

```
'PROC' CROS1(A1, B1, C1, A2, B2, C2, XX, YY);
'VALUE' A1, B1, C1, A2, B2, C2;
'REAL' A1, B1, C1, A2, B2, C2, XX, YY;
'BEGIN' "REAL' D;
D = A1↑B2 - B1↑A2;
```



```

'IF'D = 0'THEN"BEGIN'
DCXC(1,6,"CROS1 - ERROR",0,1);
'GOTO'L10'END';
XX: = (B1↑C2 - C1↑B2)/D;
YY: = (C1↑A2 - A1↑C2)/D;
L10:'END';

```

2—1—7**

```

'PROC'CROS2(X1,Y1,X2,Y2,X3,Y3,X4,Y4,GXY);
'VALUE'X1,Y1,X2,Y2,X3,Y3,X4,Y4;
'REAL'X1,Y1,X2,Y2,X3,Y3,X4,Y4;
'ARRAY'GXY;
'BEGIN"REAL'A1,B1,C1,A2,B2,C2;
LPOIN(X1,Y1,X2,Y2,A1,B1,C1);
LPOIN(X3,Y3,X4,Y4,A2,B2,C2);
CROS1(A1,B1,C1,A2,B2,C2,GXY[1],GXY[2]);
'END';

```

2—1—8**

```

'PROC'CROS3(A1,B1,C1,XC1,YC1,R1,XC,YC,KP);
'VALUE'A1,B1,C1,XC1,YC1,R1,KP;
'INTEG'KP;
'REAL'A1,B1,C1,XC1,YC1,R1,XC,YC;
'BEGIN"REAL'EPS,Z,ALPHA,
BETA,GAMMA,D,XCP,YCP,XCM,D1,YCM;
DIST4(A1,B1,C1,XC1,YC1,XC,YC);
D: = GN2((XC1 - XC)↑↑2 + (YC1 - YC)↑↑2);
'IF'ABS(D) - ABS(R1)'GR'10-5'THEN"BEGIN'
DCXC(1,6,"CROS3 - NO - POL",0,1);'GOTO'L5;'END';
'IF'ABS(D - R1)'LS'10-5'THEN"GOTO'L5;
'IF'ABS(A1)'LS'10-5'OR'
ABS(B1)'LS'10-5'THEN"GOTO'L1;
EPS: = 0.001;Z: = ABS(B1/A1);
'IF'Z'LS'EPS'THEN'B1: = 0;
L1:'IF'ABS(B1)'LS'10-5'THEN"GOTO'L2;
ALPHA: = A1↑↑2 + B1↑↑2;
BETA: = A1↑C1 + A1↑B1↑YC1 - B1↑B1↑XC1;
GAMMA: = B1↑↑2↑XC1↑↑2 + (C1 + B1↑YC1)
↑(C1 + B1↑YC1) - B1↑↑2↑R1↑↑2;
D: = BETA↑↑2 - ALPHA↑GAMMA;
'IF'D'LS'0'THEN"GOTO'L5;
XCP: = (-BETA + GN2(D))/ALPHA;
YCP: = -(A1↑XCP + C1)/B1;

```