

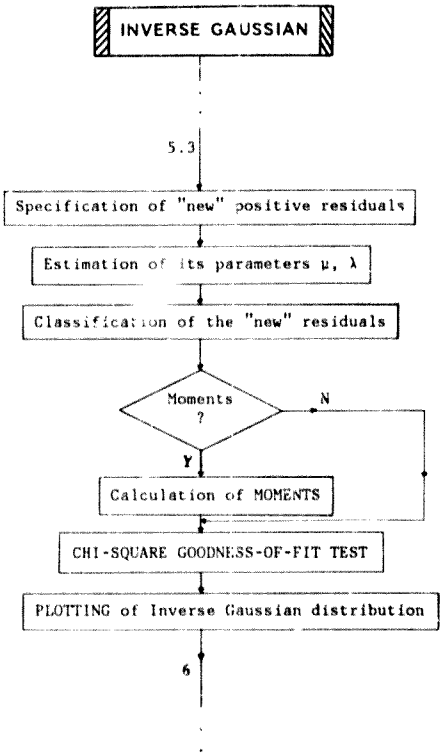
https://dspace.org/

The distribution of theodolite observations associated with open pit monitoring survey

Albanis, Alexander

2014-08-26
http://hdl.handle.net/10539/15253

Downloaded from a DSpace repository. https://dspace.org/


INVERSE GAUSSIAN
5.3
Specification of "new" positive residuals
Estimation of its parameters μ, λ
Classification of the "new" residuals
Moments ?
N
Y
Calculation of MOMENTS
CHI-SQUARE GOODNESS-OF-FIT TEST
PLOTTING of Inverse Gaussian distribution
6

G.5 PRINT OUT OF THE "HI_DI_TEST" COMPUTER PROGRAM

```
10    GOTO 46
19    MASS STORAGE IS ":HP8290X,700,1"
28    RE-STORE "HI_DI_TEST"
37    STOP
46    '
55    REM=========================================================================
64    REM
73    REM                PROGRAM FOR HISTOGRAM AND DISTRIBUTIONS
82    REM                THIS COMPUTER PROGRAM HAS BEEN COMPILED
91    REM                                  BY
100   REM
109   REM                          ALEXANDER ALBANIS
118   REM
127   REM
136   REM              MSc(Eng) - UNIVERSITY OF  HE WITWATERSRAND
145   REM
154   REM=========================================================================
163   REM
172   REM
181   PRINTER IS 1
190   DIM U(2000),R(2000),Res_1(2000),Res(2000),Ep1$(100)[8],Ep2$(100)[8]
199   DIM Res_1_inv(2000),Res_inv(2000),Obs_fr_n draw(2000)
208   DIM New1(2000),Obs_fr_n(500),Mfoen(100)
217   DIM Marker$[4],Home$[2],Clear$[2],Menu$[27]
226   DIM A(30),Th_rel_fr(500),Th_fr_e(500)
235   DIM Th_fr_e_tel(500),Obs_fr_n_tel(500),Diff(500),Pao(100)
244   DIM Test_x_2_tel(100)
253   PRINTER IS 1
262   INTEGER Point
271   GCLEAR
280   PRINT CHR$(128);
289   OUTPUT 2;"K";
298   REM-------------------------------------------------------------------------
307   REM
316   REM
325   PRINT USING 334
334   IMAGE /,8X,"        ==============================================="
343   PRINT TAB(16);CHR$(131);"   PROGRAM FOR HISTOGRAM AND DISTRIBUTIONS    "
352   PRINT CHR$(128);
361   PRINT USING 370
370   IMAGE 8X,"        ==============================================="
379   PRINT USING 388
388   IMAGE /,18X,"THIS COMPUTER PROGRAM HAS BEEN COMPILED "
397   PRINT USING 406
406   IMAGE 22X,"                    BY",/
415   PRINT TAB(22);CHR$(130);"----->  ALEXANDER ALBANIS  <-----"
424   PRINT CHR$(128);
433   PRIN  USING 442
442   IMAGE /,16X,"MSc(Eng) - UNIVERSITY OF THE WITWATERSRAND"
451   PRINT USING 460
460   IMAGE /,4X,"            It has been tested on a HP-9816 mini computer",/,4X
,"                    using a double disk drive"
469   PRINT USING 478
478   IMAGE /,8X,"        ------------------------------------------------"
487   '
496   GOSUB Carry_on
505   '
514   PRINT USING 523
523   IMAGE 10/,4X,"            This computer program is running with BASIC 2.0",/
,4X,"      and it runs with BASIC 2.0 & BASIC 2.1 with EXTENSIONS"
```

```
532   '
541   GOSUB Carry_on
550   '
559   PRINT USING 568
568   IMAGE 9/,10X,"Insert the  DATA DISK  in left disk drive (700,0) ."
577   PRINT USING 586
586   IMAGE /,9X,"Keep your  PROGRAM DISK  in right disk drive (700,1) ."
595   '
604   GOSUB Carry_on
613   '
622   PRINT USING 631
631   IMAGE /,8X,"To run  'HIST_DIST'  program, two data files are required :"
640   PRINT USING 649
649   IMAGE 2/,6X,"  1. The file of the  'OBSERVATIONAL RESIDUALS',  and",2/,6X,
"  2. The file of the  'TOTAL NO. OF THE OBS. RESIDUALS'."
658   PRINT USING 667
667   IMAGE 2/,8X,"The above files are found from the almost created files of",/
,8X,"the  'THEO'  program."
676   PRINT USING 685
685   IMAGE 8X,"Each individual set of the  'THEO'  program includes, to -",/,8X
,"tally 9 data files."
694   PRINT USING 703
703   IMAGE 8X,"You have to select from each set these two files which end",/,8X
,"in 8 (observational residuals) and 9 (total no. of the ob.",/,8X,"residuals ."
712   '
721   GOSUB Carry_on
730   '
739   MASS STORAGE IS ":HP8290X,700,0"
748   CAT
757   '
766   '
775   REM-------------------------------------------------------------------
784   REM
793   REM
802   REM*******************************************************************
811   REM                                INPUT DATA
820   REM ...............................................................
829   '
838   '
847   DISP "How many sets of the observational residuals would you like to use ?
";
856   INPUT Aa
865   Ob=0
874   Par=0
883   IF Aa=1 THEN
892     DISP "Which is the CODE no. of set no.  ";Aa;"  of the ""OBSERVATIONAL R
ESIDUALS"" ?";
901     INPUT Code1$
910     ASSIGN @Res TO Code1$
919     DISP "Which is the CODE no. of set no.  ";Aa;"  of the ""NO. OF THE OBS.
 RESIDUALS"" ?";
928     INPUT Code2$
937     ASSIGN @Top TO Code2$
946     ENTER @Top,1;Total
955     ON END @Res GOTO 991
964     FOR I=1 TO 500
973       ENTER @Res,1;U(I)
982     NEXT I
991     I=Total-1
1000    Ob=Total
```

```
1009    FOR I=1 TO Ob
1018      R(I)=U(I)
1027    NEXT I
1036  ELSE
1045    Met=0
1054    FOR I=1 TO Am
1063      DISP "Which is the CODE no. of set no.  ";I;"  of the ""OBSERVATIONAL
RESIDUALS"" ?";
1072      INPUT Code1$
1081      Met=Met+1
1090      Ep1$(Met)=Code1$
1099      ASSIGN @Res TO Code1$
1108      DISP "Which is the CODE no. of set no.  ";I;"  of the ""NO. OF THE OBS
. RESIDUALS"" ?";
1117      INPUT Code2$
1126      Ep2$(Met)=Code2$
1135      ASSIGN @Top TO Code2$
1144      ENTER @Top,1;Total
1153      ON END @Res GOTO 1198
1162      FOR J=1 TO 500
1171        Par=Par+1
1180        ENTER @Res,J;U(Par)
1189      NEXT J
1198      J=Total-1
1207      Ob=Ob+Total
1216      FOR K=(Ob-Total+1) TO Ob
1225        R(K)=U(K)
1234      NEXT K
1243      Par=Ob
1252    NEXT I
1261  END IF
1270  Obs=Ob
1279  FOR I=1 TO Obs
1288    Res_1(I)=R(I)
1297    IF Res_1(I)>=0 THEN
1306      IF (Res_1(I)*10-INT(Res_1(I)*10))>=.445 THEN
1315        Res(I)=(INT(Res_1(I)*10)+1)/10
1324      ELSE
1333        Res(I)=INT(Res_1(I)*10)/10
1342      END IF
1351    ELSE
1360      IF ABS((Res_1(I)*10)-(INT(Res_1(I)*10)+1))>=.445 THEN
1369        Res(I)=INT(Res_1(I)*10)/10
1378      ELSE
1387        Res(I)=(INT(Res_1(I)*10)+1)/10
1396      END IF
1405    END IF
1414  NEXT I
1423  Xart=0
1432  Saria=0
1441  Fora_n=1
1450  Fora_i=1
1459  Fora=1
1468  Fora_l=1
1477  OUTPUT 2;"K";
1486  !
1495  !
1504  REM-------------------------  ----------------------------------------
1513  REM
1522  REM
```

```
1531  REM*****************************************************************
1540  REN   DECISION ABOUT USING THE SCREEN AND/OR THE PRINTER FOR THE OUTPUT
1549  REM .................................................................
1558  !
1567  !
1576  OUTPUT 2;"K";
1585  DISP "Will you use PRINTER & SCREEN (=PS) or only SCREEN (=S) ?";
1594  INPUT Answer$
1603  IF Answer$[1,2]="PS" THEN
1612    Pnr=1
1621  ELSE
1630    IF Answer$[1,1]="S" THEN
1639      Pnr=0
1648      GOTO 1765
1657    ELSE
1666      GOTO 1585
1675    END IF
1684  END IF
1693  DISP "Print Printer's address (e.g. 701 etc)";
1702  INPUT Pr
1711  ASSIGN @Prt TO Pr
1720  !
1729  !
1738  REM-----------------------------------------------------------------
1747  REM
1756  REM
1765  REM*****************************************************************
1774  REM                    PRINT DATA (OBSERVATIONAL RESIDUALS)
1783  REM .................................................................
1792  !
1801  !
1810  OUTPUT 2;"K";
1819  PRINT USING 1828
1828  IMAGE 7/,"e*****************************************************************
**************",5/
1837  IF Pnr=1 THEN OUTPUT @Prt USING 1828
1846  IF Am=1 THEN
1855    PRINT USING 1864;Code1$,Code2$
1864    IMAGE 2X,"e",2X,"The CODE numbers for data files are :  ",8A,"  -  ",8A,
3/
1873    IF Pnr=1 THEN OUTPUT @Prt USING 1864;Code1$,Code2$
1882  ELSE
1891    PRINT USING 1900;Ep1$(1),Ep2$(1)
1900    IMAGE 2X,"e",2X,"The CODE numbers for data files are :  ",8A,"  -  ",8A
1909    IF Pnr=1 THEN OUTPUT @Prt USING 1909;Ep1$(1),Ep2$(1)
1918    FOR I=2 TO Met
1927      PRINT USING 1936;Ep1$(I),Ep2$(I)
1936      IMAGE 44X,8A,"  -  ",8A
1945      IF Pnr=1 THEN OUTPUT @Prt USING 1945;Ep1$(I),Ep2$(I)
1954    NEXT I
1963  END IF
1972  PRINT USING 1981
1981  IMAGE 3/,25X,"OBSERVATIONAL RESIDUALS",/,25X,"----------------------",/
1990  IF Pnr=1 THEN OUTPUT @Prt USING 1981
1999  FOR I=1 TO Obs
2008    PRINT USING 2017;Res(I)
2017    IMAGE 34X,SZ.D
2026    IF Pnr=1 THEN OUTPUT @Prt USING 2017;Res(I)
2035  NEXT I
2044  IF Obs<100 THEN
```

```
2053    PRINT USING 2062;Obs
2062    IMAGE 4/,4X,"TOTAL NO. OF OBS. RESIDUALS  =  ",2D,/,4X,"----------------
--------"
2071    IF Pnr=1 THEN OUTPUT @Prt USING 2062;Obs
2080  ELSE
2089    IF Obs>=100 AND Obs<1000 THEN
2098      PRINT USING 2107;Obs
2107      IMAGE 4/,4X,"TOTAL NO. OF OBS. RESIDUALS  =  ",3D,/,4X,"---------------
-------------"
2116      IF Pnr=1 THEN OUTPUT @Prt USING 2107;Obs
2125    ELSE
2134      PRINT USING 2143;Obs
2143      IMAGE 4/,4X,"TOTAL NO. OF OBS. RESIDUALS  =  ",4D,/,4X,"----------------
-------------"
2152      IF Pnr=1 THEN OUTPUT @Prt USING 2143;Obs
2161    END IF
2170  END IF
2179  PRINT USING 2188
2188  IMAGE 5/
2197  !
2206  !
2215  DISP "What should the class interval be ?";
2224  INPUT CI
2233  !
2242  !
2251  REM-------------------------------------------------------------------------
2260  REM
2269  REM
2278  REM=========================================================================
2287  REM          CLASSIFICATION OF THE OBSERVATIONAL RESIDUALS
2296  REM .....................................................................
2305  !
2314  !
2323  PRINT USING 2332
2332  IMAGE 7/,13X," CLASS",13X,"CLASSIFICATION OF",8X,"FREQUENCY OF"
2341  IF Pnr=1 THEN OUTPUT @Prt USING 2332
2350  PRINT USING 2359
2359  IMAGE 9X,"INTERVALS (sec)",9X,"OBS. RESIDUALS",9X,"OBS. RESIDUALS",/,6X,"-
----------------",6X,"----------------",7X,"---------------"
2368  IF Pnr=1 THEN OUTPUT @Prt USING 2359
2377  Mx=Res(1)
2386  FOR I=2 TO Obs
2395    IF Res(I)>Mx THEN
2404      Mx=Res(I)
2413    ELSE
2422      GOTO 2440
2431    END IF
2440  NEXT I
2449  Mn=Res(1)
2458  FOR I=2 TO Obs
2467    IF Res(I)<Mn THEN
2476      Mn=Res(I)
2485    ELSE
2494      GOTO 2512
2503    END IF
2512  NEXT I
2521  FOR I=-CI/2 TO -100 STEP -CI
2530    IF Mn>=I-.01 THEN
2539      I1=I
2548      GOTO 2575
```

```
2557    END IF
2566  NEXT I
2575  FOR I=C1/2 TO 100 STEP C1
2584    IF Mx<=I-.01 THEN
2593      I2=I
2602      GOTO 2629
2611    END IF
2620  NEXT I
2629  A1=I1
2638  A2=I2
2647  Kmf=0
2656  Noinl=0
2665  Noinr=0
2674  As=0
2683  Sml1=0
2692  FOR I=I1 TO I2 STEP C1
2701    IF I>I2-.01 THEN
2710      GOTO 3097
2719    END IF
2728    IF I<0 THEN
2737      Noinl=Noinl+1
2746    ELSE
2755      Noinr=Noinr+1
2764    END IF
2773    PRINT USING 2782;I,I+C1
2782    IMAGE /,6X,SZ.DD,"   ~  ",X,S?.DD,"(-)"
2791'   IF Pnr=1 THEN OUTPUT @Prt USING 2782;I,I+C1
2800    G=0
2809    FOR J=1 TO Obs
2818      IF Res(J)<(I+C1-.01) AND Res(J)>=I-.01 THEN
2827        G=G+1
2836        New1(G)=Res(J)
2845      ELSE
2854        GOTO 2872
2863      END IF
2872    NEXT J
2881    Kmf=Kmf+1
2890    Mfoen(Kmf)=G
2899    As=As+1
2908    Obs_fr_n(As)=G
2917    Obs_fr_n_draw(As)=Obs_fr_n(As)
2926    Sml1=Sml1+G
2935    IF G=0 THEN
2944      PRINT USING 2953;Obs_fr_n(As)
2953      IMAGE 62X,3D
2962'     IF Pnr=1 THEN OUTPUT @Prt USING 2953;Obs_fr_n(As)
2971    ELSE
2980      FOR L=1 TO G
2989        IF L<>G THEN
2998          PRINT USING 3007;New1(L)
3007          IMAGE 38X,SZ.D
3016'         IF Pnr=1 THEN OUTPUT @Prt USING 3007;New1(L)
3025        ELSE
3034          PRINT USING 3043;New1(L),Obs_fr_n(As)
3043          IMAGE 38X,SZ.D,20X,3D
3052'         IF Pnr=1 THEN OUTPUT @Prt USING 3043;New1(L),Obs_fr_n(As)
3061        END IF
3070      NEXT L
3079    END IF
3088  NEXT I
```

```
3097  IF Sm11<100 THEN
3106    PRINT USING 3115;Sm11
3115    IMAGE /,56X,"---------------",/,63X,2D
3124    IF Pnr=1 THEN OUTPUT @Prt USING 3115;Sm11
3133  ELSE
3142    IF Sm11>=100 AND Sm11<1000 THEN
3151      PRINT USING 3160;Sm11
3160      IMAGE /,56X,"---------------",/,62X,3D
3169      IF Pnr=1 THEN OUTPUT @Prt USING 3160;Sm11
3178    ELSE
3187      PRINT USING 3196;Sm11
3196      IMAGE /,56X,"---------------",/,61X,4D
3205      IF Pnr=1 THEN OUTPUT @Prt USING 3196;Sm11
3214    END IF
3223  END IF
3232  Max_mfoen=Mfoen(1)
3241  FOR I=2 TO Kef
3250    IF Mfoen(I)>Max_mfoen THEN
3259      Max_mfoen=Mfoen(I)
3268    ELSE
3277      GOTO 3295
3286    END IF
3295  NEXT I
3304  !
3313  IF Answer$(1,1)="S" THEN
3322    PRINT USING 3331
3331    IMAGE 4/,"**********************************************************************
**********"
3340    IF Pnr=1 THEN OUTPUT @Prt USING 3331
3349  END IF
3358  !
3367  GOSUB Carry_on
3376  !
3385  !
3394  REM-------------------------------------------------------------------------
3403  REM
3412  REM
3421  REM*************************************************************************
3430  REM                          M   E   N   U
3439  REM .....................................................................
3448  !
3457  !
3466  Clear$=CHR$(255)&CHR$(75)
3475  Home$=CHR$(235)&CHR$(84)
3484  Marker$="=>"&CHR$(8)&CHR$(9)
3493  PRINTER IS 1
3502  GRAPHICS OFF
3511  CONTROL 2,1;0
3520  CONTROL 1,4;0
3529  OUTPUT 2;Clear$;
3538  STATUS 1,9;Screen
3547  PRINT USING 3556
3556  IMAGE 5/
3565  PRINT USING 3574
3574  IMAGE 21X,"================================"
3583  PRINT TAB(22);CHR$(131);"           M  E  N  U           "
3592  PRINT CHR$(128);
3601  PRINT USING 3610
3610  IMAGE 21X,"================================",/
3619  Point=11
```

```
3620  PRINT TAB(22);"1. NORMAL(GAUSSIAN) DISTRIBUTION"
3637  PRINT TAB(22);"2. TRUNCATED NORMAL DISTRIBUTION"
3646  PRINT TAB(22);"3. INVERSE GAUSSIAN DISTRIBUTION"
3655  PRINT TABXY(17,Point);Marker$;
3664  ON KBD GOTO Select_key
3673  ON KNOB .10 GOTO Move_pointer
3682 Spin:GOTO Spin
3691  '
3700 Move_pointer:  '
3709  IF KNOBX>0 THEN
3718    Point=Point+1
3727  ELSE
3736    Point=Point-1
3745  END IF
3754  IF Point<11 THEN Point=11
3763  IF Point>13 THEN Point=13
3772  OUTPUT 2;Home$;
3781  PRINT "     "
3790  PRINT TABXY(17,Point);Marker$;
3799  GOTO Spin
3808  '
3817  OFF KBD
3826 Select_key:  '
3835  OUTPUT 2;"K";
3844  SELECT Point
3853    Me=0
3862  CASE 9+2
3871    PRINT USING 3888
3880    IMAGE 9/,18X,"..........",/,18X,".",36X,"."
3889    PRINT USING 3898
3898    IMAGE 18X,".",3X,"NORMAL(GAUSSIAN)  DISTRIBUTION",3X,".",/,18X,".","....
..........",","
3907    Menu$="NORMAL"
3916    Me=1
3925    Saria=Saria+1
3934    WAIT 1
3943    OUTPUT 2;"K";
3952  CASE 10+2
3961    Me=2
3970    Saria=Saria+1
3979    WAIT 1
3988    '
3997    GOSUB Conf_lev
4006    '
4015  CASE 11+2
4024    PRINT USING 4033
4033    IMAGE 9/,17X,"..........",/,17X,".",37X,"."
4042    PRINT USING 4051
4051    IMAGE 17X,".",3X,"INVERSE  GAUSSIAN  DISTRIBUTION",3X,".",/,17X,".","...
..........","."
4060    Menu$="INVERSE GAUSSIAN"
4069    Me=3
4078    Saria=Saria+1
4087    WAIT 1
4096  END SELECT
4105  '
4114  REM----------------------
4123  IF Me=1 THEN GOTO 4231
4132  IF Me=2 THEN GOTO 5096
4141  IF Me=3 THEN GOTO 11143
```

```
4150  REM-----------------------
4159  '
4168  '
4177  REM=====================================================================
4186  REM
4195  REM
4204  REM
4213  REM
4222  REM=====================================================================
4231  REM                  NORMAL   - GAUSSIAN -   DISTRIBUTION
4240  REM ..................................................................
4249  '
4258  '
4267  Saris=Saris+1
4276  '
4285  REM---------------------
4294  '
4303  REM::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::
4312  REM   Estimation of the Normal distribution parameters
4321  REM::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::
 330  '
4339  '
4348  Ssum=0
4357  FOR I=1 TO Obs
4366    Ssum=Ssum+Res_1(I)
4375  NEXT I
4384  Mo_nor=Ssum/Obs
4393  St=0
4402  FOR I=1 TO Obs
4411    St=St+(Res_1(I)-Mo_nor)^2
4420  NEXT I
4429  St_dev_o=SQR(St/Obs)
4438  St_dev_o_mean=St_dev_o/SQR(Obs)
4447  '
4456  '
4465  REM::::::::::::::   M O M E N T S   ::::::::::::::
4474  '
4483  GOSUB Erotis:
4492  '
4501  Sec_mom_nor=Mo_2-Mo_nor^2
4510  Third_mom_nor=(Mo_3)-(3*Mo_2*Mo_nor)+(2*Mo_nor^3)
4519  Fourth_mom_nor=(Mo_4)-(4*Mo_3*Mo_nor)+(6*Mo_2*Mo_nor^2)-(3*Mo_nor^4)
4528  Act_skew_nor=Third_mom_nor/SQR(Sec_mom_nor^3)
4537  Act_kurt_nor=Fourth_mom_nor/Sec_mom_nor^2
4546  PRINT USING 4555
4555  IMAGE 5/,29X,"====================",/,29X,"NORMAL  DISTRIBUTION",/,29X,"==
==================",/
4564  IF Pnr=1 THEN OUTPUT @Prt USING 4555
4573  IF Answer$[1,2]="PS" THEN
4582    PRINT USING 4591
4591    IMAGE 3/,22X,"THEORETICAL coefficient of SKEWNESS = 0",2/,22X,"THEORETIC
AL coefficient of KURTOSIS = 3"
4600    IF Pnr=1 THEN OUTPUT @Prt USING 4591
4609  ELSE   '  ( Answer$[1,1]="S" )
4618    PRINT TAB(23);CHR$(130);"THEORETICAL coefficient of SKEWNESS = 0"
4627    PRINT USING 4636
4636    IMAGE /
4645    PRINT TAB(23);CHR$(130);"THEORETICAL coefficient of KURTOSIS = 3"
4654    PRINT CHR$(128);
4663  END IF
```

```
4672  PRINT USING 4*    Act skew_nor,Act_kurt_nor
4681  IMAGE 3/,22X,     AL coefficient of SKEWNESS = ",3Z.3D,2/,22X,"ACTUAL coef
ficient of KURTOSIS = ",3Z.3D
4690  IF Pnr=1 THEN OUTPUT @Prt USING 4681;Act_skew_nor,Act_kurt_nor
4699  '
4708  GOSUB Carry_on
4717  '
4726  REM!!!!!!!!!!!!!!!!!!!!!!!!
4735  '
4744  '
4753  GOSUB Choice
4762  '
4771  GOSUB T_x_21
4780  '
4789  PRINT USING 4798;A1
4798  IMAGE /,5X,"-3Ø",3X,"    =  ",X,SZ.DD,"(-"
4807  IF Pnr=1 THEN OUTPUT @Prt USING 4798;A1
4816  Categ=Categ+1
4825  Area_1=Ø
4834  FOR I=-3 TO A1 STEP Dx
4843    Fx_1=1/(St_dev_o*SQR(2*PI))*EXP(-.5*((I-Mo_nor)/St_dev_o)^2)
4852    Area_1=Area_1+Fx_1*Dx
4861  NEXT I
4870  Area_2=Ø
4879  FOR J=-3 TO -3Ø STEP Dx
4888    Fx_2=1/(St_dev_o*SQR(2*PI))*EXP(-.5*((J-Mo_nor)/St_dev_o)^2)
4897    Area_2=Area_2+Fx_2*Dx
4906  NEXT J
4915  Area=Area_1-Area_2
4924  Aarea=Area
4933  '
4942  GOSUB Exp
4951  '
4960  REM * % %
4969  Gam=A1
4978  FOR I=A1 TO A2 STEP C1
4987    IF I>A2-.Ø1 THEN
4996      GOTO 5194
5005    END IF
5014    Categ=Categ+1
5023    PRINT USING 5032;I,I+C1
5032    IMAGE /,5X,SZ.DD,"    -  ",X,SZ.DD,"(-)"
5041    IF Pnr=1 THEN OUTPUT @Prt USING 5032;I,I+C1
5050    Gam=Gam+C1
5059    Area_1=Ø
5068    FOR K=-3Ø TO Gam STEP Dx
5077      Fx_1=1/(St_dev_o*SQR(2*PI))*EXP(-.5*((K-Mo_nor)/St_dev_o)^2)
5086      Area_1=Area_1+Fx_1*Dx
5095    NEXT K
5104    Area=Area_1-Aarea
5113    Aarea=Aarea+Area
5122    '
5131 @-- GOSUB Topographos_1
5140    '
5149    GOSUB Topographos_2
5158    '
5167    GOSUB Topographos_3
5176    '
5185  NEXT I
5194  REM % % %
```

```
5203  PRINT USING 5212;A2
5212  IMAGE /,5X,SZ.DD,X,"  -  ",X,"+S "
5221  IF Par=1 THEN OUTPUT @Prt USING 5212;A2
5230  Categ=Categ+1
5239  Area_1=0
5248  FOR I=-5 TO 5 STEP Dx
5257    Fx_1=1/(St_dev_o*SQR(2*PI))*EXP(-.5*((I-Mo_nor)/St_dev_o)^2)
5266    Area_1=Area_1+Fx_1*Dx
5275  NEXT I
5284  Area=Area_1-Aarea
5293  '
5302  GOSUB Emp
5311  '
5320  GOSUB T_x_22
5329  '
5338  REM::::::::::::::::::   P L O T   N O R M A L   ::::::::::::::::::::::::
5347  '
5356  GOSUB Graph
5365  '
5374  GOSUB Arrise
5383  '
5392  T=0
5401  Ft=0
5410  Fx=0
5419  Y=0
5428  IF Ap$(1,1)="S" THEN
5437    LINE TYPE 8
5446  END IF
5455  I=0
5464  Ft_mean=1/(St_dev_o*SQR(2*PI))
5473  '
5482  Scale_nor=Th_fr_e_max/Ft_mean
5491  '
5500  FOR I=-(Noinl*Cl*100) TO (Noinr+1)*(Cl*100) STEP Bnma
5509    T=((I/100)-Mo_nor)/St_dev_o
5518    Ft=1/(St_dev_o*SQR(2*PI))*EXP(-T^2/2)*Scale_nor
5527    Y=Ft
5536    IF I=-(Noinl*Cl*100) THEN
5545      MOVE I,Y
5554      PEN 2   '  Red pen
5563    ELSE
5572      DRAW I,Y
5581    END IF
5590  NEXT I
5599  LDIR 0
5608  IF Ap$(1,1)="S" THEN
5617    VIEWPORT 0,200,0,200
5626    WINDOW 0,200,0,200
5635    MOVE 3,180
5644    IDRAW 0,0
5653    LORG 2
5662    MOVE 10,180
5671    CSIZE 3.5,.4
5680    LINE TYPE 1,5
5689    LABEL " : Normal dist. "
5698  ELSE    '  ( IF Ap$(1,2)="PL" )
5707    VIEWPORT 3,134,9,86
5716    WINDOW 0,100,0,100
5725    MOVE 2,95 ' 2,95.5
5734    IDRAW 2,0
```

```
5743    LORG 2
5752    MOVE 5,95  : 5,95
5761    CSIZE 1.5,.5
5770    LABEL " : Normal dist. "
5779    PEN 0
5788    PENUP
5797  END IF
5806  '
5815  '
5824  Mc=0
5833  GOTO 14491
5842  '
5851  '
5860  REM------------------------------------------------------------------------
5869  REM
5878  REM
5887  REM========================================================================
5896  REM                  TRUNCATED  NORMAL  DISTRIBUTIO?
5905  REM ....................................................................
5914  '
5923  '
5932  Saris=Saris+1
5941  '
5950  REM-----------------------
5959  IF ABS(Tim_l*100-(INT(Tim_l*,00)+1)))>=.445 THEN
5968    Im_l=INT(Tim_l*100)/100
5977  ELSE
5986    Im_l=(INT(Tim_l*100)+1)/100
5995  END IF
6004  IF (Tim_r*100-INT(Tim_r*100))>=.445 THEN
6013    Im_r=(INT(Tim_r*100)+1)/100
6022  ELSE
6031    Im_r=INT(Tim_r*100)/100
6040  END IF
6049  '
6058  '
6067  REM::::::::::::::    M O M E N T S    ::::::::::::::
6076  '
6085  GOSUB Erotis:
6094  '
6103  Sec_mom_tr=Mo_2-Mo_tr^2
6112  Third_mom_tr=(Mo_3)-(3*Mo_2*Mo_tr)+(2*Mo_tr^3)
6121  Fourth_mom_tr=(Mo_4)-(4*Mo_3*Mc_tr)+(6*Mo_2*Mc_tr^2)-(3*Mo_tr^4)
6130  Act_skew_tr=Th rd_mom_tr/SQR(Sec_mom_tr^3)
6139  Act_kurt_tr=Fourth_mom_tr/Sec_mom_tr^2
6148  '
6157  Th_skew_tr=0
6166  IF Lab=1 THEN
6175    Th_kurt_tr_l=5.200
6184  ELSE
6193    IF Lab=2 THEN
6202      Th_kurt_tr_l=4.135
6211    ELSE '  ( Lab=3 )
6220      Th_kurt_tr_l=3.510
6229    END IF
6238  END IF
6247  Th_kurt_tr=INT(Th_kurt_tr_l*1000)/1000
6256  '
6265  IF Lab=1 THEN
6274    PRINT USING 6283
```

```
6283     IMAGE 5/,20X,"=======================================",
6292     IF Pnr=1 THEN OUTPUT @Prt USING 6283
6301     PRINT USING 6310
6310     IMAGE 20X,"TRUNCATED  NORMAL  DISTRIBUTION  ( 95% )",/,20X,"==========
==========================",/
6319     IF Pnr=1 THEN OUTPUT @Prt USING 6310
6328   ELSE
6337     IF Lab=2 THEN
6346       PRINT USING 6355
6355       IMAGE 5/,18X,"======================================="
6364       IF Pnr=1 THEN OUTPUT @Prt USING 6355
6373       PRINT USING 6382
6382       IMAGE 18X,"TRUNCATED  NORMAL  DISTRIBUTION  ( 97.5% )",/,18X,"=======
==============================",/
6391       IF Pnr=1 THEN OUTPUT @Prt USING 6382
6400     ELSE   ! ( Lab=3 )
6409       PRINT USING 6418
6418       IMAGE 5/,20X,"======================================="
6427       PRINT USING 6436
6436       IMAGE 20X,"TRUNCATED  NORMAL  DISTRIBUTION  ( 99% )",/,20X,"==========
=======================",/
6445       IF Pnr=1 THEN OUTPUT @Prt USING 6436
6454     END IF
6463   END IF
6472   IF Answer$[1,2]="PS" THEN
6481     PRINT USING 6490;Th_kurt_tr
6490     IMAGE 3/,20X,"THEORETICAL coeffic.ent of SKEWNESS = 0",2/,20X,"THEORETIC
AL coefficient of KURTOSIS = ",D.3D
6499     IF Pnr=1 THEN OUTPUT @Prt USING 6490;Th_kurt_tr
6508   ELSE   ! ( Answer$[1,1]="S" )
6517     PRINT TAB(21);CHR$(130);"THEORETICAL coefficient of SKEWNESS = ";Th_skew
_tr
6526     PRINT USING 6535
6535     IMAGE /
6544     PRINT TAB(21);CHR$(130);"THEORETICAL coefficient of KURTOSIS = ";Th_kurt
_tr
6553     PRINT CHR$(128);
6562   END IF
6571   PRINT USING 6580;Act_skew_tr,Act_kurt_tr
6580   IMAGE 3/,22X,"ACTUAL coefficient of SKEWNESS = ",SZ.3D,2/,22X,"ACTUAL coef
ficient of KURTOSIS = ",SZ.3D
6589   IF Pnr=1 THEN OUTPUT @Prt USING 6580;Act_skew_tr,Act_kurt_tr
6599   !
6607   GOSUB Carry_on
6616   !
6625   REM!!!!!!!!!!!!!!!!!!!!!!!!!!!
6634   !
6643   !
6652   GOSUB Choice
6661   !
6670   GOSUB T_x_21
6679   !
6688   IF Tim_1<A1 THEN
6697     W1=A1
6706     GOTO 6832
6715   ELSE
6724     B1=A1
6733     Dr1=ABS(ABS(B1)-ABS(Tim_1))
6742     FOR I=1 TO 100
6751       IF Dr1<C1 THEN
```

```
6760          W1=B1
6769          GOTO 6832
6778        ELSE
6787          B1=B1+C1
6796          Dr1=ABS(ABS(B1)-ABS(Tim_r))
6805        END IF
6814      NEXT I
6823    END IF
6832    IF Tim_r>A2 THEN
6841      W2=A2
6850      GOTO 6976
6859    ELSE
6868      B2=A2
6877      Dr2=ABS(B2-ABS(Tim_r))
6886      FOR I=1 TO 100
6895        IF Dr2<C1 THEN
6904          W2=B2
6913          GOTO 6976
6922        ELSE
6931          B2=B2-C1
6940          Dr2=ABS(B2-ABS(Tim_r))
6949        END IF
6958      NEXT I
6967    END IF
6976    Sur2=Im_r
6985    !
6994    REM!!!!!!!!!!!!!!!!!!!!!!!!
7003    !
7012    !
7021    I_dph_ba=1/Dph_ba
7030    !
7039    !
7048    IF Tim_1<=W1 THEN
7057      Sur1=W1
7066      IF Tim_1*W1=.005 AND Tim_1<=W1 THEN
7075        PRINT USING 7084;Im_1,W1
7084        IMAGE /,5X,"<-",X,SZ.DD," - ",X,SZ.DD,"(-)"
7093        IF Prn=1 THEN OUTPUT @Prt USING 7084;Im_1,W1
7102        GOTO 7147
7111      END IF
7120      PRINT USING 7129;Im_1,W1
7129      IMAGE /,5X,SZ.DD,X," - ",X,SZ.DD,"(-)"
7138      IF Prn=1 THEN OUTPUT @Prt USING 7129;Im_1,W1
7147      Categ=Categ+1
7156      Area_1=0
7165      FOR I=-10 TO W1 STEP Dx
7174        Fx_1=(1/St_dev_tr)*(1/SQR(2*PI))*EXP(-.5*((I-Mo_tr)/St_dev_tr)^2)*I_dp
h_ba
7183        Area_1=Area_1+Fx_1*Dx
7192      NEXT I
7201      Area_2=0
7210      FOR I=-10 TO Tim_1 STEP Dx
7219        Fx_2=(1/St_dev_tr)*(1/SQR(2*PI))*EXP(-.5*((I-Mo_tr)/St_dev_tr)^2)*I_dp
h_ba
7228        Area_2=Area_2+Fx_2*Dx
7237      NEXT I
7246      Area=Area_1-Area_2
7255      Aarea=Area
7264      !
7273      GOSUB Graphics_1
```

```
7282    '
7291    FOR M=1 TO Obs
7300      IF Res(M)<(W1-.001) AND Res(M)>=(Tim_l-.001) THEN
7309        G=G+1
7318        New1(G)=Res(M)
7327      ELSE
7336        GOTO 7354
7345      END IF
7354    NEXT M
7363    '
7372    GOSUB Topographos_3
7381    '
7390    REM % % %
7399    IF Tim_r>W2 THEN
7408      Gam=W1
7417      FOR I=W1 TO W2 STEP C1
7426        IF I>W2-.01 THEN
7435          GOTO 7633
7444        END IF
7453        Categ=Categ+1
7462        PRINT USING 7471;I,I+C1
7471        IMAGE /,5X,$Z.DD,"   -   ",X,$Z.DD,"(--)"
7480        IF Pnr=1 THEN OUTPUT @Prt USING 7471;I,I+C1
7489        Gam=Gam+C1
7498        Area_1=0
7507        FOR K=Tim_l TO Gam STEP Dx
7516          Fx_1=(1/St_dev_tr)*(1/SQR(2*PI))*EXP(-.5*((K-Mo_tr)/St_dev_tr)^2)*I_coh_ba
7525          Area_1=Area_1+Fx_1*Dx
7534        NEXT K
7543        Area=Area_1-Aarea
7552        Aarea=Aarea+Area
7561        '
7570        GOSUB Topographos_1
7579        '
7588        GOSUB Topographos_2
7597        '
7606        GOSUB Topographos_3
7615        '
7624      NEXT I
7633      REM ' ' '
7642      IF Tim_r>=W2 AND Tim_r<W2+.005 THEN
7651        PRINT USING 7660;W2,Im_r
7660        IMAGE /,5X,$Z.DD,X,"   -   ",X,$Z.DD,X,"--)"
7669        IF Pnr=1 THEN OUTPUT @Prt USING 7660;W2,Im_r
7678        GOTO 7723
7687      END IF
7696      PRINT USING 7705;W2,Im_r
7705      IMAGE /,5X,$Z.DD,X,"   -   ",X,$Z.DD
7714      IF Pnr=1 THEN OUTPUT @Prt USING 7705;W2,Im_r
7723      Categ=Categ+1
7732      Area_1=0
7741      FOR I=W2 TO Tim_r STEP Dx
7750        Fx_1=(1/St_dev_tr)*(1/SQR(2*PI))*EXP(-.5*((I-Mo_tr)/St_dev_tr)^2)*I_dph_ba
7759        Area_1=Area_1+Fx_1*Dx
7768      NEXT I
7777      Area=Area_1
7786      '
7795      GOSUB Topographos_1
```

```
7004        '
7013        FOR M=1 TO Obs
7022          IF Res(M)<Tim_r AND Res(M)>=(W2-.01) THEN
7031            G=G+1
7040            New1(G)=Res(M)
7049          ELSE
7058            GOTO 7076
7067          END IF
7076        NEXT M
7085        '
7094        GOSUB Topographos_3
7103        '
7112      ELSE      '  ( IF Tim_r<=W2 )
7921        Gam=W1
7930        FOR I=W1 TO W2-C1 STEP C1
7939          IF I>(W2-C1)-.01 THEN
7948            GOTO 8146
7957          END IF
7966          Categ=Categ+1
7975          PRINT USING 7984;I,I+C1
7984          IMAGE /,5X,SZ.DD,"  -  ",X,SZ.DD,"(-)"
7993          IF Pnr=1 THEN OUTPUT @Prt USING 7984;I,I+C1
8002          Gam=Gam+C1
8011          Area_1=0
8020          FOR K=Tim_1 TO Gam STEP Dx
8029            Fx_1=(1/St_dev_tr)*(1/SQR(2*PI))*EXP(-.5*((K-Mo_tr)/St_dev_tr)^2)*
I_dph_ba
8038            Area_1=Area_1+Fx_1*Dx
8047          NEXT K
8056          Area=Area_1-Aarea
8065          Aarea=Aarea+Area
8074          '
8083          GOSUB Topographos_1
8092          '
8101          GOSUB Topographos_2
8110          '
8119          GOSUB Topographos_3
8128          '
8137        NEXT I
8146        REM ' ' '
8155        IF Tim_r>=W2-C1 AND Tim_r<(W2-C1)+.005 THEN
8164          PRINT USING 8173;W2-C1,Im_r
8173          IMAGE /,5X,SZ.DD,X,"  -  ",X,SZ.DI,X,"->"
8182          IF Pnr=1 THEN OUTPUT @Prt USING 8173;W2-C1,Im_r
8191          GOTO 8236
8200        END IF
8209        PRINT USING 8218;W2-C1,Im_r
8218        IMAGE /,5X,SZ.DD,X,"  -  ",X,SZ.DD
9227        IF Pnr=1 THEN OUTPUT @Prt USING 8218;W2-C1,Im_r
8236        Categ=Categ+1
8245        Area_1=0
8254        FOR I=W2-C1 TO Tim_r STEP Dx
8263          Fx_1=(1/St_dev_tr)*(1/SQR(2*PI))*EXP(-.5*((I-Mo_tr)/St_dev_tr)^2)*I_
dph_ba
8272          Area_1=Area_1+Fx_1*Dx
8281        NEXT I
8290        Area=Area_1
8299        '
8308        GOSUB Topographos_1
8317        '
```

```
8326        FOR M=1 TO Obs
8335          IF Res(M)<Tim_r AND Res(M)>=(W2-C1-.01) THEN
8344            G=G+1
8353            New1(G)=Res(M)
8362          ELSE
8371            GOTO 8389
8380          END IF
8389        NEXT M
8398        '
8407        GOSUB Topographos_3
8416        '
8425      END IF
8434    ELSE       ' ( IF Tim_1>W1 )
8443      Sur1=W1+C1
8452      IF Tim_1>(W1+C1)-.005 AND Tim_1<=W1+C1 THEN
8461        PRINT USING 8470;Im_1,W1+C1
8470        IMAGE /,5X,"   ",X,SZ.DD," - ",X,SZ.DD,"(-)"
8479        IF Pnr=1 THEN OUTPUT @Prt USING 8470;Im_1,W1+C1
8488        GOTO 8533
8497      END IF
8506      PRINT USING 8515;Im_1,W1+C1
8515      IMAGE /,5X,SZ.DD,X,"  -  ",X,SZ.DD,    "
8524      IF Pnr=1 THEN OUTPUT @Prt USING 8515;  _1,W1+C1
8533      Categ=Categ+1
8542      Area_1=0
8551      FOR I=-10 TO (W1+C1) STEP Dx
8560        Fx_1=(1/St_dev_tr)*(1/SQR(2*PI))*EXP(-.5*((I-Mo_tr)/St_dev_tr)^2)*I_dp
h_ba
8569        Area_1=Area_1+Fx_1*Dx
8578      NEXT I
8587      Area_2=0
8596      FOR I=-10 TO Tim_1 STEP Dx
8605        Fx_2=(1/St_dev_tr)*(1/SQR(2*PI))*EXP(-.5*((I-Mo_tr)/St_dev_tr)^2)*I_dp
h_ba
8614        Area_2=Area_2+Fx_2*Dx
8623      NEXT I
8632      Area=Area_1-Area_2
8641      Aarea=Area
8650      '
8659      GOSUB Topographos_1
8668      '
8677      FOR M=1 TO Obs
8686        IF Res(M)<(W1+C1-.001) AND Res(M)>=(Tim_1-.001) THEN
8695          G=G+1
8704          New1(G)=Res(M)
8713        ELSE
8722          GOTO 8740
8731        END IF
8740      NEXT M
8749      '
8758      GOSUB Topographos_3
8767      '
8776    REM ' ' '
8785      IF Tim_r>W2 THEN
8794        Sam=W1+C1
8803        FOR I=W1+C1 TO W2 STEP C1
8812          IF I>W2-.01 THEN
8821            GOTO 9019
8830          END IF
8839          Categ=Categ+1
```

```
8840          PRINT USING 8857;I,I+C1
8857          IMAGE /,5X,SZ.DD,"    -  ",X,SZ.DD,"(-)"
8866          IF Pnr=1 THEN OUTPUT @Prt USING 8857;I,I+C1
8875          Gam=Gam+C1
8884          Area_1=0
8893          FOR K=Tim_1 TO Gam STEP Dx
8902            Fx_1=(1/St_dev_tr)*(1/SQR(2*PI))*EXP(-.5*((K-Mo_tr)/St_dev_tr)^2)*
I_dph_ba
8911            Area_1=Area_1+Fx_1*Dx
8920          NEXT K
8929          Area=Area_1-Aarea
8938          Aarea=Aarea+Area
8947          '
8956          GOSUB Topographos_1
8965          '
8974          GOSUB Topographos_2
8983          '
8992          GOSUB Topographos_3
9001          '
9010        NEXT I
9019        REM ' ' '
9028        IF Tim_r<W2 AND Tim_r<W2+.005 THEN
9037          PRINT USING 9046;W2,Im_r
9046          IMAGE /,5X,SZ.DD,X,"  -  ",X,SZ.DD,X,"-"
9055          IF Pnr=1 THEN OUTPUT @Prt USING 9046;W2,Im_r
9064          GOTO 9109
9073        END IF
9082        PRINT USING 9091;W2,Im_r
9091        IMAGE /,5X,SZ.DD,X,"  -  ",X,SZ.DD
9100        IF Pnr=1 THEN OUTPUT @Prt USING 9091;W2,Im_r
9109        Categ=Categ+1
9118        Area_1=0
9127        FOR I=W2 TO Tim_r STEP Dx
9136          Fx_1=(1/St_dev_tr)*(1/SQR(2*PI))*EXP(-.5*((I-Mo_tr)/St_dev_tr)^2)*I_
dph_ba
9145          Area_1=Area_1+Fx_1*Dx
9154        NEXT I
9163        Area=Area_1
9172        '
9181        GOSUB Topographos_1
9190        '
9199        FOR M=1 TO Obs
9208          IF Res(M)<Tim_r AND Res(M)>=(W2-.01) THEN
9217            G=G+1
9226            New1(G)=Res(M)
9235          ELSE
9244            GOTO 9262
9253          END IF
9262        NEXT M
9271        '
9280        GOSUB Topographos_3
9289        '
9298 @-ELSE     '  ( IF Tim_r<=W2 )
9307        Gam=W1+C1
9316        FOR I=W1+C1 TO W2-C1 STEP .1
9325          IF I/(W2-C1)=.61 THEN
9334            GOTO 9532
9343          END IF
9352          Categ=Categ+1
9361          PRINT USING 9370;I,I+C1
```

```
9370        IMAGE /,5X,SZ.DD,"   -  ",X,SZ.DD,"(-)"
9379        IF Pnr=1 THEN OUTPUT @Prt USING 9370;I,I+C1
9388        Gam=Gam+C1
9397        Area_1=0
9406        FOR K=Tim_1 TO Gam STEP Dx
9415          Fx_1=(1/St_dev_tr)*(1/SQR(2*PI))*EXP(-.5*((K-Mo_tr)/St_dev_tr)^2)*
I_dph_ba
9424          Area_1=Area_1+Fx_1*Dx
9433        NEXT K
9442        Area=Area_1-Aarea
9451        Aarea=Aarea+Area
9460        '
9469        GOSUB Topographos_1
9478        '
9487        GOSUB Topographos_2
9496        '
9505        GOSUB Topographos_3
9514        '
9523      NEXT I
9532      REM ' ' '
9541      IF Tim_r>=W2-C1 AND Tim_r<(W2-C1)+.005 THEN
9550        PRINT USING 9559;W2-C1,Im_r
9559        IMAGE /,5X,SZ.DD,X,"  -  ",X,SZ.DD,X,"->"
9568        IF Pnr=1 THEN OUTPUT @Prt USING 9568;W2-C1,Im_r
9577        GOTO 9622
9586      END IF
9595      PRINT USING 9604;W2-C1,Im_r
9604      IMAGE /,5X,SZ.DD,X,"  -  ",X,SZ.DD
9613      IF Pnr=1 THEN OUTPUT @Prt USING 9604;W2-C1,Im_r
9622      Categ=Categ+1
9631      Area_1=0
9640      FOR I=W2-C1 TO Tim_r STEP Dx
9649        Fx_1=(1/St_dev_tr)*(1/SQR(2*PI))*EXP(-.5*((I-Mo_tr)/St_dev_tr)^2)*I_
dph_ba
9658        Area_1=Area_1+Fx_1*Dx
9667      NEXT I
9676      Area=Area_1
9685      '
9694      GOSUB Topographos_1
9703      '
9712      FOR M=1 TO Obs
9721        IF Res(M)<Tim_r AND Res(M)>=(W2-C1-.01) THEN
9730          G=G+1
9739          New1(G)=Res(M)
9748        ELSE
9757          GOTO 9775
9766        END IF
9775      NEXT M
9784      '
9793      GOSUB Topographos_3
9802      '
9811    END IF
9820  END IF
9829  '
9838  GOSUB T_x_22
9847  '
9856  '
9865  REM:::::::   P L O T   T R U N C A T E D   N O R M A L   :::::::
9874  '
9883  GOSUB Graph
```

```
9892  '
9901  DEG
9910  LDIR 0
9919  LINE TYPE 1,5
9928  LORG 4
9937  MOVE Im_l*100,.1
9946  PEN 4      '  Brown pen
9955  DRAW Im_l*100,-.1
9964  MOVE Im_l*100,0
9973  IF Ap$[1,2]="PL" THEN
9982    CSIZE 2.0,.5
9991    LABEL USING 10000;Im_l
10000   IMAGE 2Z.DD
10009 ELSE
10018   CSIZE 2.5,.5
10027   LABEL USING 10036;Im_l
10036   IMAGE 2Z.DD
10045 END IF
10054 LORG 4
10063 MOVE Im_r*100,.1
10072 DRAW Im_r*100,-.1
10081 MOVE Im_r*100,0
10090 IF Ap$[1,2]="PL" THEN
10099   CSIZE 2.0,.5
10108   LABEL USING 10117;Im_r
10117   IMAGE Z.DD
10126 ELSE
10135   CSIZE 2.5,.5
10144   LABEL USING 10153;Im_r
10153   IMAGE Z.DD
10162 END IF
10171 '
10180 GOSUB Arkise
10189 '
10198 IF Ap$[1,1]="S" THEN
10207   LINE TYPE 3
10216 END IF
10225 I_dph_ba=1/Dph_ba
10234 Zz_mean=(1/St_dev_tr)*(1/SQR(2*PI))*I_dph_ba
10243 '
10252 Scale_tr=Tr_fr_e_max/Zz_mean
10261 '
10270 FOR I=(Im_l*100) TO (Im_r*100) STEP Bnma
10279   Zz=(1/St_dev_tr)*(1/SQR(2*PI))*EXP(-.5*(((I/100)-Mo_tr)/St_dev_tr)^2)*I_
dph_ba*Scale_tr
10288   Y=Zz
10297   IF I=(Im_l*100) THEN
10306     MOVE I,Y
10315     PEN 4    '  Blue pen
10324   ELSE
10333     DRAW I,Y
10342   END IF
10351 NEXT I
10360 LDIR 0
10369 IF Ap$[1,1]="S" THEN
10378   VIEWPORT 0,200,0,200
10387   WINDOW 0,200,0,200
10396   MOVE 3,170
10405   IDRAW 8,0
10414   LORG 2
```

```
10423   MOVE 10,170
10432   CSIZE 3.5, .4
10441   LINE TYPE 1,5
10450   IF Lab=1 THEN
10459     LABEL USING 10468
10468     IMAGE " : Truncated Normal dist. ",#
10477     MOVE 65,170
10486     LABEL "( 95% )"
10495   ELSE
10504     IF Lab=2 THEN
10513       LABEL USING 10522
10522       IMAGE " : Truncated Normal dist. ",#
10531       MOVE 65,170
10540       LABEL "( 97.5% )"
10549     ELSE
10558       LABEL USING 10567
10567       IMAGE " : Truncated Normal dist.  .#
10576       MOVE 65,170
10585       LABEL "( 99% )"
10594     END IF
10603   END IF
10612 ELSE     ! IF Ap$[1,2]="PL"
10621   VIEWPORT 3,134,9,86
10630   WINDOW 0,100,0,100
10639   MOVE 2,92
10648   IDRAW 2,0
10657   LORG 2
10666   MOVE 5,92
10675   CSIZE 1.5,.5
10684   IF Lab=1 THEN
10693     LABEL USING 10702
10702     IMAGE " : Truncated Normal dist. ",#
10711     MOVE 20,92
10720     LABEL "( 95% )"
10729   ELSE
10738     IF Lab=2 THEN
10747       LABEL USING 10756
10756       IMAGE " : Truncated Normal dist. ",#
10765       MOVE 20,92
10774       LABEL "( 97.5% )"
10783     ELSE
10792       LABEL USING 10801
10801       IMAGE " : Truncated Normal dist. ",#
10810       MOVE 20,92
10819       LABEL "( 99% )"
10828     END IF
10837   END IF
10846   PEN 0
10855   PENUP
10864 END IF
10873 REM!!!
```

```
10954   Fore_l=1
10963   Sxrie=1
10972   GOSUB Conf_.e
10981   '
10990   GOSUB Classification
10999   '
11008   GOTO 5896
11017 ELSE
11026   IF Af$(1,1)="N" THEN
11035     Me=0
11044     GOTO 14491
11053   ELSE
11062     GOTO 10900
11071   END IF
11080 END IF
11089 '
11098 '
11107 REM------------------------------------------------------------------------
11116 REM
11125 REM
11134 REM************************************************************************
11143 REM                  INVERSE  GAUSSIAN  DISTRIBUTION
11152 REM ..................................................... ..................
11161 '
11170 '
11179 REM;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;
11188 REM Estimation of the Inverse Gaussian distribution parameters
11197 REM;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;
11206 '
11215 '
11224 REM;;;;   "NEW"  RESIDUALS  FOR INVERSE  GAUSSIAN  DISTRIBUTION   ;;;;;
11233 '
11242 Kx=C1-A1
11251 FOR I=1 TO Obs
11260   Res_1_inv(I)=Kx+Res_1(I)
11269 NEXT I
11278 Ssum_inv=0
11287 FOR I=1 TO Obs
11296   Ssum_inv=Ssum_inv+Res_1_inv(I)
11305 NEXT I
11314 Mo_inv=Ssum_inv/Obs
11323 St_inv=0
11332 FOR I=1 TO Obs
11341   St_inv=St_inv+(Res_1_inv(I)-Mo_inv)^2
11350 NEXT I
11359 Disp_inv=(Mo_inv^3*Obs)/St_inv
11368 '
11377 FOR I=1 TO Obs
11386   Res_inv(I)=Kx+Res(I)
11395 NEXT I
11404 '
11413 '
11422 REM;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;
11431 REM    PRINT  " NEW "  RESIDUALS FOR INVERSE GAUSSIAN DISTRIBUTION
11440 REM;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;
11449 '
11458 '
11467 OUTPUT 2;"K";
11476 IF Answer$(1,2)="PS" THEN
11485   PRINT USING 11494
```

```
11494   IMAGE 4/,"%%%
```

```
11971 '
11980 '
11989 PRINT USING 11998
11998 IMAGE 7/,13X," CLASS",13X,"CLASSIFICATION OF",8X,"FREQUENCY OF"
12007 IF Pnr=1 THEN OUTPUT @Prt USING 11998
12016 PRINT USING 12025
12025 IMAGE 9X,"INTERVALS (sec)",9X,"OBS. RESIDUALS",9X,"OBS. RESIDUALS",/,6X,"-
----------",6X,"----------",7X,"----------"
12034 IF Pnr=1 THEN OUTPUT @Prt USING 12025
12043 Mx_inv=Res_inv(1)
12052 FOR I=2 TO Obs
12061   IF Res_inv(I)>Mx_inv THEN
12070     Mx_inv=Res_inv(I)
12079   ELSE
12088     GOTO 12106
12097   END IF
12106 NEXT I
12115 Mn_inv=Res_inv(1)
12124 FOR I=2 TO Obs
12133   IF Res_inv(I)<Mn_inv THEN
12142     Mn_inv=Res_inv(I)
12151   ELSE
12160     GOTO 12178
12169   END IF
12178 NEXT I
12187 FOR I=0 TO 10  STEP C1
12196   IF Mx_inv<=  .01 THEN
12205     I2_inv=I
12214     GOTO 12232
12223   END IF
12232 NEXT I
12241 I1_inv=C1
12250 A1_inv=I1_inv
12259 A2_inv=I2_inv
12263 Kmf=0
12277 As=0
12286 Sm1=0
12295 FOR I=I1_inv TO I2_inv STEP C1
12304   IF I>I2_inv-.01 THEN
12313     GOTO 12646
12322   END IF
12331   PRINT USING 12340;I,I+C1
12340   IMAGE /,6X,SZ.DD,"   -   ",X,SZ.DD,"(-)"
12349   IF Pnr=1 THEN OUTPUT @Prt USING 12340;I,I+C1
12358   G=0
12367   FOR J=1 TO Obs
12376     IF Res_inv(J)<(I+C1-.01) AND Res_inv(J)>=I-.01 THEN
12385       G=G+1
12394       New1(G)=Res_inv(J)
12403     ELSE
12412       GOTO 12430
12421     END IF
12430   NEXT J
12439   Kmf=Kmf+1
12448   Mfopn(Kmf)=G
12457   As=As+1
12466   Obs_fr_n(As)=G
12475   Sm 1=Sm11+G
12484   IF G=0 THEN
12493     PRINT USING 12500;Obs_fr_n(As)
```

```
12502       IMAGE 62X,3D
12511       IF Fnr=1 THEN OUTPUT @Prt USING 12502;Obs_fr_n(As)
12520     ELSE
12529       FOR L=1 TO G
12538         IF L< G THEN
12547           PRINT USING 12556;New1(L)
12556           IMAGE 38X,SZ.D
12565           IF Fnr=1 THEN OUTPUT @Prt USING 12556;New1(L)
12574         ELSE
12583           PRINT USING 12592;New1(L),Obs_fr_n(As)
12592           IMAGE 38X,SZ.D,20X,3D
12601           IF Fnr=1 THEN OUTPUT @Prt USING 12592;New1(L),Obs_fr_n(As)
12610         END IF
12619       NEXT L
12628     END IF
12637   NEXT I
12646   IF Sm11<100 THEN
12655     PRINT USING 12664;Sm11
12664     IMAGE /,56X,"----------",/,63X,2D
12673     IF Fnr=1 THEN OUTPUT @Prt USING 12664;Sm11
12682   ELSE
12691     IF Sm11>=100 AND Sm11<1000 THEN
12700       PRINT USING 12709;Sm11
12709       IMAGE /,56X,"----------",/,62X,3D
12718       IF Fnr=1 THEN OUTPUT @Prt USING 12709;Sm11
12727     ELSE
12736       PRINT USING 12745;Sm11
12745       IMAGE /,56X,"----------",/,61X,4D
12754       IF Fnr=1 THEN OUTPUT @Prt USING 12745;Sm11
12763     END IF
12772   END IF
12781   Max_mfoen=Mfoen(1)
12790   FOR I=2 TO Kmf
12799     IF Mfoen(I)>Max_mfoen THEN
12808       Max_mfoen=Mfoen(I)
12817     ELSE
12826       GOTO 12844
12835     END IF
12844   NEXT I
12853   !
12862   IF Answer$[1,1]="S" THEN
12871     PRINT USING 12888
12880     IMAGE 4/,"**********************************************************************
**********"
12889     IF Fnr=1 THEN OUTPUT @Prt USING 12888
12898   END IF
12907   !
12916   GOSUB Carry_on
12925   !
12934   REM!!!!!!!!!!!!!!!!!!!!!!!!
12943   Saris=Saris+1
12952   !
12961   !
12970   REM!!!!!!!!!!!!!    M O M E N T S    !!!!!!!!!!!!!!
12979   !
12988   GOSUB Erotis1
12997   !
13006   Sec_mom_inv=Mo_2-Mo_inv^2
13015   Third_mom_inv=(Mo_3)-(3*Mo_2*Mo_inv)+(2*Mo_inv^3)
13024   Fourth_mom_inv=(Mo_4)-(4*Mo_3*Mo_inv)+(6*Mo_2*Mo_inv^2)-(3*Mo_inv^4)
```

```
13033 Act_skew_inv=Third_mom_inv/SQR(Sec_mom_inv^3)
13042 Act_kurt_inv=Fourth_mom_inv/Sec_mom_inv^2
13051 '
13060 Th_skew_inv_1=3*SQR(Mo_inv/Disp_inv)
13069 Th_kurt_inv_1=15*Mo_inv/Disp_inv+3
13078 Th_skew_inv=INT(Th_skew_inv_1*1000)/1000
13087 Th_kurt_inv=INT(Th_kurt_inv_1*1000)/1000
13096 '
13105 PRINT USING 13114
13114 IMAGE 5/,24X,"*****************************",/,24X,"INVERSE  GAUSSIAN  D
ISTRIBUTION",/,24X,"*****************************",/
13123 IF Pnr=1 THEN OUTPUT @Prt USING 13114
13132 IF Answer$[1,2]="PS" THEN
13141   PRINT USING 13150;Th_skew_inv,Th_kurt_inv
13150   IMAGE 3/,20X,"THEORETICAL coefficient of SKEWNESS = ",D.3D,2/,20X,"THEOR
ETICAL coefficient of KURTOSIS = ",D.3D
13159   IF Pnr=1 THEN OUTPUT @Prt USING 13150;Th_skew_inv,Th_kurt_inv
13168 ELSE    !   ( Answer$[1,1]="S" )
13177   PRINT TAB(21);CHR$(130);"THEORETICAL coefficient of SKEWNESS = ";Th_skew
_inv
13186   PRINT USING 13195
13195   IMAGE /
13204   PRINT TAB(21);CHR$(130);"THEORETICAL coefficient of KURTOSIS = ";Th_kurt
_inv
13213   PRINT CHR$(128);
13222 END IF
13231 PRINT USING 13240;Act_skew_inv,Act_kurt_inv
13240 IMAGE 3/,22X,"ACTUAL coefficient of SKEWNESS = ",SZ.3D,2/,22X,"ACTUAL coef
ficient of KURTOSIS = ",SZ.3D
13249 IF Pnr=1 THEN OUTPUT @Prt USING 13240;Act_skew_inv,Act_kurt_inv
13258 '
13267 GOSUB Carry_on
13276 '
13285 REM!!!!!!!!!!!!!!!!!!!!!!!!!
13294 '
13303 '
13312 GOSUB Choice
! (21 '
13330 GOSUB T_x_21
13339 '
13348 PRINT USING 13357;A1_inv
13357 IMAGE /,5X,"+0.05 ,X,"   -  ",X,SZ.DD,"(-)"
13366 IF Pnr=1 THEN OUTPUT @Prt USING 13357;A1_inv
13375 Categ=Categ+1
13384 Area_1=0
13393 FOR I=.03 TO A1_inv STEP Dx
13402   Fx_1=SQR(Disp_inv/(2*PI*I^3))*EXP(-(Disp_inv*(I-Mo_inv)^2)/(2*Mo_inv^2*I
))
13411   Area_1=Area_1+Fx_1*Dx
13420 NEXT I
13429 Area_2=0
13438 FOR J=.03 TO .05 STEP Dx
13447   Fx_2=SQR(Disp_inv/(2*PI*J^3))*EXP(-(Disp_inv*(J-Mo_inv)^2)/(2*Mo_inv^2*J
))
13456   Area_2=Area_2+
13465 NEXT J
13474 Area=Area_1-Area_
13483 Aarea=Area
13492 '
13501 GOSUB Emp
```

```
13510 '
13519 REM ' ' '
13528 Gam=A1_inv
13537 FOR I=A1_inv TO A2_inv STEP C1
13546   IF I>A2_inv-.01 THEN
13555     GOTO 13753
13564   END IF
13573   Categ=Categ+1
13582   PRINT USING 13591;I,I+C1
13591   IMAGE /,5X,SZ.DD,"  -  ",X,SZ.DD,"(-)"
13600   IF Pnr=1 THEN OUTPUT @Prt USING 13591;I,I+C1
13609   Gam=Gam+C1
13618   Area_1=0
13627   FOR K=.05 TO Gam STEP Dx
13636     Fx_1=SQR(Disp_inv/(2*PI*K^3))*EXP(-(Disp_inv*(K-Mo_inv)^2)/(2*Mo_inv^2
*K))
13645     Area_1=Area_1+Fx_1*Dx
13654   NEXT K
13663   Area=Area_1-Aarea
13672   Aarea=Aarea+Area
13681   '
13690   GOSUB Topographos_1
13699   '
13708   GOSUB Topographos_2
13717   '
13726   GOSUB Topographos_3
13735   '
13744 NEXT I
13753 REM ' ' '
13762 PRINT USING 13771;A2_inv
13771 IMAGE /,5X,SZ.DD,X,"  -  ",X,"+Ø"
13780 IF Pnr=1 THEN OUTPUT @Prt USING 13771;A2_inv
13789 Categ=Categ+1
13798 Area_1=0
13807 FOR I=.05 TO 3Ø STEP Dx
13816   Fx_1=SQR(Disp_inv/(2*PI*I^3))*EXP(-(Disp_inv*(I-Mo_inv)^2)/(2*Mo_inv^2*I
))
13825   Area_1=Area_1+Fx_1*Dx
13834 NEXT I
13843 Area=Area_1-Aarea
13852 '
13861 GOSUB Emp
13870 '
13879 GOSUB T_x_22
13888 '
13897 '
13906 REM;;;;  P L O T   I N V E R S E   G A U S S I A N   D I S T R.  ;;;;
13915 '
13924 GOSUB Graph
13933 '
13942 GOSUB Arxise
13951 '
13960 IF Ap$(1,2)="PL" THEN
13969   PEN Ø
13978   PRINT USING 13987
13987   IMAGE 9/,10X,"Put the   LADI PEN   in the position of the   PEN 3 ."
13996   '
14005   GOSUB Carry_on
14014   '
14023   PEN 3     '  Ladi pen
```

```
14032 END IF
14041 IF Ap$[1,1]="S" THEN
14050   LINE TYPE 3
14059 END IF
14068 Eth_mean=0
14077 Y_mean=SQR(Disp_inv/(2*PI*Mo_inv^3))
14086 !
14095 Scale_inv=Th_fr_e_mean/Y_mean
14104 !
14113 Kx_1=C1/2+ABS(A1)+C1/2
14122 FOR I=-(Noinl*C1*100) TO (Noinr+1)*(C1*100) STEP 8mma
14131   Eth=EXP(-((Disp_inv*((Kx_1+(I/100))-Mo_inv)^2)/(2*Mo_inv^2*(Kx_1+(I/100)
)))
14140   Y=SQR(Disp_inv/(2*PI*(Kx_1+(I/100))^3))*Eth*Scale_inv
14149   IF I=-(Noinl*C1*100) THEN
14158     MOVE I,Y
14167   ELSE
14176     DRAW I,Y
14185   END IF
14194 NEXT I
14203 LDIR 0
14212 IF Ap$[1,1]="S" THEN
14221   VIEWPORT 0,200,0,200
14230   WINDOW 0,200,0,200
14239   MOVE 3,160
14248   IDRAW 8,0
14257   LORG 2
14266   MOVE 10,160
14275   CSIZE 3.5,.4
14284   LINE TYPE 1,5
14293   LABEL " ; Inverse Gaussian dist. "
14302 ELSE      ! ( IF Ap$[1,2]="PL" )
14311   VIEWPORT 3,171,9,86
14320   WINDOW 0,100,0,100
14329   MOVE 2,89
14338   IDRAW 2,0
14347   LORG 2
14356   MOVE 5,89
14365   CSIZE 1.5,.5
14374   LABEL " ; Inverse Gaussian dist. "
14383   PEN 0
14392   PENUP
14401 END IF
14410 !
14419 !
14428 Me=0
14437 GOTO 14491
14446 !
14455 !
14464 REM-------------------------------------------------------------------
14473 REM
14482 REM
14491 REM+++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
14500 !
14509 !
14518 DISP "Do you want to see the DIFFERENCE between Theoretical-Observed distr
. (Y/N)?";
14527 INPUT Viepo$
14536 IF Viepo$[1,1]="Y" THEN
14545   OUTPUT 2;"K";
```

```
14554   Alekos=1
14563   GOTO 14788
14572 ELSE
14581   IF Vlepo$(1,1)="N" THEN
14590     GOTO 14641
14599   ELSE
14608     GOTO 14518
14617   END IF
14626 END IF
14635 '
14644 DISP "Do you want to see any other distributions of the fore-mentioned one
s (Y/N) ?";
14653 INPUT Distr$
14662 IF Distr$(1,1)="Y" THEN
14671   GOTO 15031
14680 ELSE
14689   IF Distr$(1,1)="N" THEN
14698     GOTO 15787
14707   ELSE
14716     GOTO 14644
14725   END IF
14734 END IF
14743 '
14752
14761 REM++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
14770 REM
14779 REM
14788 REM=============================================================
14797 REM        DIFFERENCE BETWEEN THEORETICAL AND OBSERVED DISTRIBUTION
14806 REM .....................................................................
.4815 '
14824 '
14833 Max_diff=Diff(1)
14842 FOR I=2 TO Metr
14851   IF Max_diff>=Diff(I) THEN
14860     GOTO 14896
14869   ELSE
14878     Max_diff=Diff(I)
14887   END IF
14896 NEXT I
14905 Min_diff=Diff(1)
14914 FOR I=2 TO Metr
14923   IF Min_diff<=Diff(I) THEN
14932     GOTO 14968
14941   ELSE
14950     Min_diff=Diff(I)
14959   END IF
14968 NEXT I
14977 '
14986 GOSUB Graph
14995 '
15004 Alekos=0
15013 GOTO 14644
15022 '
15031 REM=============================================================
15040 REM                          M   E   N   U
15049 REM .....................................................................
15058 '
15067 '
15076 Clear$=CHR$(255)&CHR$(75)
```

```
15085 Home$=CHR$(255)&CHR$(84)
15094 Marker$="*"&CHR$(8)&CHR$(8)
15103 PRINTER IS 1
15112 GRAPHICS OFF
15121 CONTROL 2,1;0
15130 CONTROL 1,4;0
15139 OUTPUT 2;Clear$;
15148 STATUS 1,9;Screen
15157 PRINT USING 15166
15166 IMAGE 5/
15175 PRINT USING 15184
15184 IMAGE 21X,"================================"
15193 PRINT TAB(22);CHR$(131);"           M  E  N  U           "
15202 PRINT CHR$(128);
15211 PRINT USING 15220
15220 IMAGE 21X,"================================",/
15229 Point=11
15238 PRINT TAB(22);"1. NORMAL(GAUSSIAN) DISTRIBUTION"
15247 PRINT TAB(22);"2. TRUNCATED NORMAL DISTRIBUTION"
15256 PRINT TAB(22);"3. INVERSE GAUSSIAN DISTRIBUTION"
15265 PRINT TABXY(17,Point);Marker$;
15274 ON KBD GOTO Select_key_2
15283 ON KNOB .10 GOTO Move_pointer_2
15292 Spin_2:GOTO Spin_2
15301 '
15310 Move_pointer_2:
15319 IF KNOB1>0 THEN
15328   Point=Point+1
15337 ELSE
15346   Point=Point-1
15355 END IF
15364 IF Point<11 THEN Point=11
15373 IF Point>13 THEN Point=13
15382 OUTPUT 2;Home$;
15391 PRINT "     "
15400 PRINT TABXY(17,Point);Marker$;
15409 GOTO Spin_2
15418 '
15427 OFF KBD
15436 Select_key_2: '
15445 OUTPUT 2;"K";
15454 SELECT Point
15463   Me=0
15472 CASE 9*2
15481   PRINT USING 15490
15490   IMAGE 9/,18X,"....................................",/,18X,".",36X,"."
15499   PRINT USING 15508
15508   IMAGE 18X,".",3X,"NORMAL(GAUSSIAN)  DISTRIBUTION",3X,".",/,18X,".","....
.............................","."
15517   Menu$="NORMAL"
15526   Me=1
15535   '
15544   GOSUB Classification
15553   '
15562   OUTPUT 2;"K";
15571   GOTO 4231
15580 CASE 10*2
15589   Me=2
15598   Fore_1=1
15607   Barie=1
```

```
15616   '
15625   GOSUB Conf_lev
15634   '
15643   GOSUB Classification
15652   '
15661   GOTO 5896
15670 CASE 11+2
15679   PRINT USING 15688
15688   IMAGE 9/,17X,"......................................",/,17X,".",37X,"."
15697   PRINT USING 15706
15706   IMAGE 17X,".",3X,"INVERSE  GAUSSIAN  DISTRIBUTION",3X,".",/,17X,".","...
.................................",".."
15715   Menu$="INVERSE GAUSSIAN"
15724   Me=3
15733   GOTO 11143
15742 END SELECT
15751 '
15760 REM+++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
15769 '
15778 '
15787 DISP "Do you want another run with the same data (Y/N) ?";
15796 INPUT Nr$
15805 IF Nr$[1,1]="Y" THEN
15814   OUTPUT 2;"K";
15823   GCLEAR
15832   GOTO 1270
15841 ELSE
15850   IF Nr$[1,1]="N" THEN
15859     IF Answer$[1,2]="PS" THEN
15868       PRINT USING 15877
15877       IMAGE 5/,"*****************************************************
********************",5/
15886       IF Pnr=1 THEN OUTPUT @Prt USING 15877
15895     END IF
15904     OUTPUT 2;"K";
15913     GCLEAR
15922     GINIT
15931     GOTO 31240
15940   ELSE
15949     GOTO 15787
15958   END IF
15967 END IF
15976 '
15985 '
15994 REM+++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
16003 REM
16012 REM
16021 REM
16030 REM ##########################################################################
16039 REM ###############                                          ###############
16048 REM                    S  U  B  R  O  U  T  I  N  E  S
16057 REM ###############                                          ###############
16066 REM ##########################################################################
16075 '
16084 '
16093 REM=========================================================================
16102 REM                    SUBROUTINE     Carry_on
16111 REM ..........................................................................
16120 REM
16129 STOP
```

```
16138 Carry_on:'
16147 '
16156 DISP "Press <CONTINUE> to continue";
16165 PAUSE
16174 OUTPUT 2;"K";
16183 RETURN
16192 '
16201 REM//////%%%%%%%%%%%%%%%%%%                    //////%%%%%%%%%%%%%%%%%%
16210 '
16219 '
16228 REM=============================================================================
16237 REM                          SUBROUTINE    Conf_lev
16246 REM .....................................................................
16255 REM
16264 STOP
16273 Conf_lev:'
16282 '
16291 OUTPUT 2;"K";
16300 GCLEAR
16309 '
16318 REM:::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::.
16327 REM                          S  U  B  -  M  E  N  U
16336 REM:::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::
16345 '
16354 '
16363 REM-----------------------------------------------------------------------
16372 REM      Estimation of the Truncated Normal distribution parameters
16381 REM              using the Normal distribution parameters
16390 REM .....................................................................
16399 '
16408 '
16417 Ssum=0
16426 FOR I=1 TO Obs
16435   Ssum=Ssum+Rr<_1(I)
16444 NEXT I
16453 Mo_nor=Ssum/Obs
16462 '
16471 Mo_tr=Mo_nor
16480 '
16489 St=0
16498 FOR I=1 TO Obs
16507   St=St+(Res_1(I)-Mo_nor)^2
16516 NEXT I
16525 St_dev_o=SQR(St/Obs)
16534 '
16543 St_dev_tr=St_dev_o
16552 '
16561 St_dev_o_mean=St_dev_o/SQR(Obs)
16570 '
16579 St_dev_tr_mean=St_dev_o_mean
16588 '
16597 REM-------------------------
16606 '
16615 '
16624 Clear$=CHR$(255)&CHR$(75)
16633 Home$=CHR$(255)&CHR$(84)
16642 Marker$="+)"&CHR$(8)&CHR$(8)
16651 PRINTER IS 1
16660 IF Menu$(1,1)="T" AND Fora>1 THEN
16669   GRAPHICS OFF
```

```
16670   Fora=1
16687   Fora_1=1
16696   Saris=1
16705 END IF
16714 CONTROL 2,1:0
16723 CONTROL 1,4:0
16732 OUTPUT 2;Clear$;
16741 STATUS 1,9;Screen
16750 PRINT USING 16759
16759 IMAGE 5/
16768 PRINT USING 16777
16777 IMAGE 21X,"================================"
16786 PRINT TAB(20);CHR$(131);"     S  U  R  -  M  E  N  U     "
16795 PRINT CHR$(128);
16804 PRINT USING 16813
16813 IMAGE 21X,"================================",/
16822 Point=11
16831 PRINT TAB(22);"1. TRUNCATED NORMAL   ( 95% )"
16840 PRINT TAB(22);"2. TRUNCATED NORMAL   ( 97.5% )"
16849 PRINT TAB(22);"3. TRUNCATED NORMAL   ( 99% )"
16858 PRINT TABXY(17,Point);Marker$;
16867 ON KBD GOTO Select_key_1
16876 ON KNOB .10 GOTO Move_pointer_1
16885 Spin_1:GOTO Spin_1
16894 '
16903 Move_pointer_1: '
16912 IF KNOBX>0 THEN
16921   Point=Point+1
16930 ELSE
16939   Point=Point-1
16948 END IF
16957 IF Point<11 THEN Point=11
16966 IF Point>13 THEN Point=13
16975 OUTPUT 2;Home$;
16984 PRINT "     "
16993 PRINT TABXY(17,Point);Marker$;
17002 GOTO Spin_1
17011 '
17020 OFF KBD
17029 Select_key_1: '
17038 OUTPUT 2;"K";
17047 SELECT Point
17056   Me=0
17065 CASE 9*2
17074   IF Fora_1=1 AND Saris=1 T
17083     PRINT USING 17092
17092     IMAGE 9/,15X,"..... ... ..     ..............................",/,15X,
".",46X,"."
17101     PRINT USING 17110
17110     IMAGE 15X,".",3X,"TRUNCATED  NORMAL  DISTRIBUTION  ( 95% )",3X,".",/,1
5X,"..............................................."
17119   END IF
17128 GRAPHICS ON
17137   Tim_l=Mo_nor-1.960*St_dev_o
17146   Tim_r=Mo_nor+1.960*St_dev_o
17155   Dph_ba=.9500
17164   Lab=1
17173   Menu$="TRUNCATED NORMAL   ( 95% )"
17182   WAIT 1
17191   OUTPUT 2;"K";
```

```
17200 CASE 10+2
17209   IF Fora_1=1 AND Saris=1 THEN
17218     PRINT USING 1722'
17227     IMAGE 9/,13X,'.............................................................",/,13
X,".",48X,"."
17236     PRINT USING 17245
17245     IMAGE 13X,".",3X,"TRUNCATED  NORMAL  DISTRIBUTION  ( 97.5% )",3X,".",/
,13X,"..................................  ................."
17254   END IF
17263   GRAPHICS ON
17272   Tim_l=Mo_nor-2.244*St_dev_o
17281   Tim_r=Mo_nor+2.244*St_dev_o
17290   Doh_ba=.9750
17299   Lab=2
17308   Menu$="TRUNCATED NORMAL  ( 97.5% )"
17317   WAIT 1
17326   OUTPUT 2;"K";
17335 CASE 11+2
17344   IF Fora_1=1 AND Saris=1 THEN
17353     PRINT USING 17362
17362     IMAGE 9/,15X,"..............................................................",/,15X,
".",46X,"."
17371     PRINT USING 17380
17380     IMAGE 15X,".",3X,"TRUNCATED  NORMAL  DISTRIBUTION  ( 99% )",3X,".",/,1
5X,"..................................................."
17389   END IF
17398   GRAPHICS ON
17407   Tim_l=Mo_nor-2.576*St_dev_o
17416   Tim_r=Mo_nor+2.576*St_dev_c
17425   Doh_ba=.9900
17434   Lab=3
17443   Menu$="TRUNCATED NORMAL  ( 99% )"
17452   WAIT 1
17461   OUTPUT 2;"K";
17470 END SELECT
17479 Fora=Fora+1
17488 RETURN
17497 '
17506 REM//////%%%%%%//////%%%%%%                    //////%%%%%%//////%%%%%%
17515 '
17524 '
17533 REM=================================================================
17542 REM      SUBROUTINE    Choice    FOR DECISION FOR TEST X^2
17551 REM ..................................................................
17560 REM
17569 STOP
17578 Choice:'
17587 '
17596 PRINT USING 17605
17605 IMAGE 10/,16X,"======================================================"
17614 PRINT TAB(17);CHR$(131);"  C H I - S Q U A R E  GOODNESS-OF-FIT  TEST  "
17623 PRINT CHR$(128);
17632 PRINT USING 17641
17641 IMAGE 16X,"======================================================"
17650 WAIT 5
17659 IF Me=1 THEN GOTO 4771
17668 IF Me=2 THEN GOTO 6670
17677 IF Me=3 THEN GOTO 13330
17686 RETURN
17695 '
```

```
17704 REM//////%%%%%%%%%%//////%%%%%%                    //////%%%%%%%%%%//////%%%%%%
17713 '
17722 '
17731 REM=============================================================================
17740 REM  SUBROUTINE      T_x_21      FOR TEST  X^2  FOR FIT OF GOODNESS    (1)
17749 REM -----------------------------------------------------------------------------
17758 REM
17767 STOP
17776 T_x_21:'
17785 '
17794 REM;;;;;;;;;  CALCULATION OF THE THEORITICAL FREQUENCY  ;;;;;;;;;
17803 '
17812 OUTPUT 2;"K";
17821 GCLEAR
17830 IF Answer$[1,2]="PS" THEN
17839   IF Erot$[1,1]="Y" THEN
17848     GOTO 17920
17857   ELSE !  ( Erot$[1,1]="N" )
17866     PRINT USING 17875
17875       IMAGE 4/,"%%%%%%%%%%
```

```
18200     IMAGE 3/,20X,"TRUNCATED  NORMAL  DISTRIBUTION  ( 99% )",/,20X,"*******
**********************************"
18217     IF Pnr=1 THEN OUTPUT @Prt USING 18208
18226   END IF
18235 END IF
18244 GOTO 16290
18253 PRINT USING 18262
18262 IMAGE 3/,24X,"INVERSE  GAUSSIAN  DISTR BUTION",/,24X,"*******************
**********"
18271 IF Pnr=1 THEN OUTPUT @Prt USING 18262
18280 PRINT USING 18289
18289 IMAGE 4/,11X," CLASS",11X," CLASSIF.  OF",6X,"THEORETICAL",6X,"OBSERVED"
18298 IF Pnr=1 THEN OUTPUT @Prt USING 18289
18307 PRINT USING 18316
18316 IMAGE 7X,"INTERVALS (we)",4X,"  OBS.  RESIDUALS",3X,"FREQUENCY (e)",3X,"FR
EQUENCY (n)"
18325 IF Pnr=1 THEN OUTPUT @Prt USING 18316
18334 PRINT USING 18343
18343 IMAGE 7X,"--------  ----------",3X,"---------------",3X,"--------------",3X,
"--------------"
18    IF Pnr=1 THEN OUTPUT @Prt USING 18343
1     Dx=.01
18    Metr=0
18279 Categ=0
18388 Lmt=0
18397 Sm11=0
18406 Ss=0
18415 Sss=0
18424 RETURN
18433 '
18442 REM//////%%%%%%//////%%%%%%                    //////%%%%%%//////%%%%%%
18451 '
18460 '
18469 REM================================================================
18478 REM  SUBROUTINE     T_x_22     FOR TEST  X  FOR FIT OF GOODNESS   (2)
18487 REM ................................................................
18496 REM
18505 STOP
18514 T_x_22:
18523 '
18532 Ss=Obs
18541 REM--------------------
18550 IF Obs<100 THEN
18559    PRINT USING 18568;Ss,Sm11
18568    IMAGE /,49X,"---------",8X,"------",/,50X,2D.2D,12X,2D
18577    IF Pnr=1 THEN OUTPUT @Prt USING 18568;Ss,Sm11
18586 ELSE
18595    IF Obs>=100 AND Obs<1000 THEN
18604       PRINT USING 18613;Ss,Sm11
18613       IMAGE /,48X,"---------",8X,"-------",/,49X,3D.2D,11X,3D
18622       IF Pnr=1 THEN OUTPUT @Prt USING 18613;Ss,Sm11
18631       PAUSE
18640    ELSE
18649       PRINT USING 18658;Ss,Sm11
18658       IMAGE /,48X,"---------",8X,"-------",/,48X,4D.2D,10X,4D
18667       IF Pnr=1 THEN OUTPUT @Prt USING 18658;Ss,Sm11
18676    END IF
18685 END IF
18694 REM--------------------
18703 '
```

```
18208     IMAGE 3/,20X,"TRUNCATED  NORMAL  DISTRIBUTION  ( 99% )",/,20X," ******
**********************************"
18217     IF Pnr=1 THEN OUTPUT @Prt USING 18208
18226   END IF
18235 END IF
18244 GOTO 18280
18253 PRINT USING 18262
18262 IMAGE 3/,24X,"INVERSE  GAUSSIAN  DISTR BUTION",/,24X,"==================
==========="
18271 IF Pnr=1 THEN OUTPUT @Prt USING 18262
18280 PRINT USING 18289
18289 IMAGE 4/,11X," CLASS",11X," CLASSIF. ",6X,"THEORETICAL",6X,"OBSERVED"
18298 IF Pnr=1 THEN OUTPUT @Prt USING 18289
18307 PRINT USING 18316
18316 IMAGE 7X,"INTERVALS (sec)",4X,"  OBS. RESIDUALS",3X,"FREQUENCY (e)",3X,"FR
EQUENCY (o)"
18325 IF Pnr=1 THEN OUTPUT @Prt USING 18316
18334 PRINT USING 18343
18343 IMAGE 5X,"----------",7X,"----------",3X,"----------",3X,
"----------"
18352 IF Pnr=1 THEN OUTPUT @Prt USING 18343
18361 D=.01
18370 Metr=0
18379 Categ=0
18388 Amt=0
18397 Sm11=0
18406 Ss=0
18415 Sss=0
18424 RETURN
18433 !
18442 REM//////%%%%%% ////%%%%%%                    //////%%%%%%//////%%%%%%
18451 !
18460 !
18469 REM================================================================
18478 REM  SUBROUTINE     T_x_22     FOR TEST  X 2  FOR FIT OF GOODNESS   (2)
18487 REM ..............  ..............  ..................................
18496 REM
18505 STOP
18514 T_x_22:!
18523 !
18532 Ss=Obs
18541 REM------------------------
18550 IF Obs<100 THEN
18559   PRINT USING 18568;Ss,Sm11
18568   IMAGE /,48X,"---------",8X,"------",/,50X,2D.2D,12X,2D
18577   IF Pnr=1 THEN OUTPUT @Prt USING 18568;Ss,Sm11
18586 ELSE
18595   IF Obs>=100 AND Obs<1000 THEN
18604     PRINT USING 18613;Ss,Sm11
18613     IMAGE /,48X,"---------",8X,"-------",/,49X,3D.2D,11X,3D
18622     IF Pnr=1 THEN OUTPUT @Prt USING 18613;Ss,Sm11
18631     PAUSE
18640   ELSE
18649     PRINT USING 18658;Ss,Sm11
18658     IMAGE /,48X,"---------",8X,"-------",/,48X,4D.2D,10X,4D
18667     IF Pnr=1 THEN OUTPUT @Prt USING 18658;Ss,Sm11
18676   END IF
18685 END IF
18694 REM------------------------
18703 !
```

```
18712 WAIT 2
18721 Categ_n=1
18730 Kar1=0
18739 Kar2=0
18748 Sss=0
18757 Z=0
18766 FOR Metr=1 TO Categ
18775   Z=Z+1
18784   Kar1=Kar1+Obs_fr_n(Metr)
18793   Kar2=Kar2+Th_fr_e(Metr)
18802   IF Metr=Categ AND Kar2>=5 THEN
18811     Th_fr_e_tel(Categ_n)=Kar2
18820     Obs_fr_n_tel(Categ_n)=Kar1
18829     Test_x_2_tel(Categ_n)=(Kar1-Kar2)^2/Kar2
18838     FOR I=1 TO Categ_n
18847       Sss=Sss+Test_x_2_tel(I)
18856     NEXT I
18865     GOTO 19279
18874   END IF
18883   IF Metr=Categ AND Kar2<5 THEN
18892     Categ_n=Categ_n-1
18901     Th_fr_e_tel(Categ_n)=Th_fr_e_tel(Categ_n)+Kar2
18910     Obs_fr_n_tel(Categ_n)=Obs_fr_n_tel(Categ_n)+Kar1
18919     Pao(Categ_n)=Pao(Categ_n)+1
18928     Test_x_2_tel(Categ_n)=(Obs_fr_n_tel(Categ_n)-Th_fr_e_tel(Categ_n))^2/T
h_fr_e_tel(Categ_n)
18937     FOR I=1 TO Categ_n
18946       Sss=Sss+Test_x_2_tel(I)
18955     NEXT I
18964     GOTO 19099
18973   END IF
18982   IF Kar2>=5 THEN
18991     Th_fr_e_tel(Categ_n)=Kar2
19000     Obs_fr_n_tel(Categ_n)=Kar1
19009     Test_x_2_tel(Categ_n)=(Kar1-Kar2)^2/Kar2
19018     Pao(Categ_n)=Z
19027     Categ_n=Categ_n+1
19036     Kar1=0
19045     Kar2=0
19054     Z=0
19063   ELSE
19072     GOTO 19090
19081   END IF
19090 NEXT Metr
19099 IF Categ_n<=3 THEN
19108   WAIT 2
19117   OUTPUT 2;"K";
19126   PRINT USING 19135;Categ_n
19135   IMAGE /,15X,"Since the Theoretical (Expected) frequency for each",/,15X,
"class interval should not be LESS than 5, we have ",D
19144   PRINT USING 19153
19153   IMAGE 15X,"NEW categories. However, because the degrees of",/,15X,"freed
om ( must be >=1 ) are calculated as:",2/,25X,"No. of new categories - 2"
19162   PRINT USING 19171
19171   IMAGE /,15X "it means that the Chi-Square test does not work for",/,15X,
 "this specific class interval. Therefore, you have to"
19180   PRINT USING 19189
19189   IMAGE 15X,"run the same set of data with",/
19198   PRINT TAB(32);CHR$(130);"      S M A L L E R"
19207   PRINT CHR$(128);
```

```
19216    PRINT USING 19225
19225    IMAGE /,15X,"class interval ( so, the degrees of freedom will be",/,15X,
"increased ),"
19234    !
19243    GOSUB Carry_on
19252    !
19261    GOTO 20800
19270 END IF
19279 PRINT USING 19288;Categ_n
19288 IMAGE 5/,"Since the Theoretical (Expected) frequency for each class interv
al should not",/,"be LESS than 5, we have the following ",DD," NEW categories:"
19297 IF Prn=1 THEN OUTPUT @Prt USING 19288;Categ_n
19306 PRINT USING 19315
19315 IMAGE 5/,15X," CLASS",12X,"THEORETICAL",6X,"OBSERVED"
19324 IF Prn=1 THEN OUTPUT @Prt USING 19315
19333 PRINT USING 19342
19342 IMAGE 11x,"INTERVALS [sec]",5X,"FREQUENCY (e)",3X,"FREQUENCY (n)",3X,"(n-e
)^2/e"
19351 IF Prn=1 THEN OUTPUT @Prt USING 19342
19360 PRINT USING 19369
19369 IMAGE 8X,"---------- -----",3X,"----------",3X,"----------",3X,"
----------"
19378 IF Prn=1 THEN OUTPUT @Prt USING 19369
19387 REM------------------------
19396 IF Me=1 OR Me=3 THEN
19405    IF Me=3 THEN
19414       C1=A1
19423       C2=A2
19432       A1=A1_inv
19441       A2=A2_inv
19450    END IF
19459    Alp=A1+C1*Pac(1)-C1
19468    IF Me=1 THEN
19477       PRINT USING 19486;Alp,Th_fr_e_tel(1),Obs_fr_n_tel(1),Test_x_2_tel(1)
19486       IMAGE /,8X,"-30",5X," - ",X,5Z.DD,"(-)",6X,3D.DD,12X,3D.DD,8X,3D.3D
19495       IF Prn=1 THEN OUTPUT @Prt USING 19486;Alp,Th_fr_e_tel(1),Obs_fr_n_tel(
1),Test_x_2_tel(1)
19504    ELSE    ! ( Me=3 )
19513       PRINT USING 19522;Alp,Th_fr_e_tel(1),Obs_fr_n_tel(1),Test_x_2_tel(1)
19522       IMAGE /,8X,"+0.05 ",2X," - ",X,5Z.DD,"(-)",6X,"TD DD,12X,3D,8X,3D.3D
19531       IF Prn=1 THEN OUTPUT @Prt USING 19522;Alp,Th_fr_e_tel(1),Obs_fr_n_tel(
1),Test_x_2_tel(1)
19540    END IF
19549    FOR Categ_n=2 TO Categ_n-1
19558       Alp1=Alp
19567       Alp=Alp+C1*Pac(Categ_n)
19576       IF Alp>=A2 THEN
19585          GOTO 19639
19594       END IF
19603       PRINT USING 19612;Alp1,Alp,Th_fr_e_tel(Categ_n),Obs_fr_n_tel(Categ_n),
Test_x_2_tel(Categ_n)
19612       IMAGE /,8X,5Z.DD,3X," - ",X,5Z.DD,"(-)",6X,3D.DD,12X,3D,8X,3D.3D
19621       IF Prn=1 THEN OUTPUT @Prt USING 19612;Alp1,Alp,Th_fr_e_tel(Categ_n),Ob
s_fr_n_tel(Categ_n),Test_x_2_tel(Categ_n)
19630    NEXT Categ_n
19639    PRINT USING 19648;Alp,Th_fr_e_tel(Categ_n),Obs_fr_n_tel(Categ_n),Test_x_
2_tel(Categ_n)
19648    IMAGE /,8X,5Z.DD,3X," - ",X,"+30",11X,3D.DD,12X,3D,8X,3D.3D
19657    IF Prn=1 THEN OUTPUT @Prt USING 19648;Alp,Th_fr_e_tel(Categ_n),Obs_fr_n_
tel(Categ_n),Test_x_2_tel(Categ_n)
```

```
19666   '
19675   GOSUB Ektvpos1
19684   '
19693   IF Me=3 THEN
19702     A1=C1
19711     A2=C2
19720   END IF
19729   '
19738 ELSE   !  ( Me=2 )
19747   Wlp=Sur1+C1*Pao(1)-C1
19756   PRINT USING 19765:Im_1,Wlp,Th_fr_e_tel(1),Obs_fr_n_tel(1),Test_x_2_tel(1
)
19765   IMAGE /,8X,SZ.DD,3X," - ",X,SZ.DD,"(-)",6X,3D.DD,12X,3D,8X,3D.3D
19774   IF Pnr=1 THEN OUTPUT @Prt USING 19765:Im_1,Wlp,Th_fr_e_tel(1),Obs_fr_n_t
el(1),Test_x_2_tel(1)
19783   FOR Categ_n=2 TO Categ_n-1
19792     Wlp1=Wlp
19801     Wlp=Wlp+C1*Pao(Categ_n)
19810     IF Wlp>Sur2 THEN
19819       GOTO 19873
19828     END IF
19837     PRINT USING 19846:Wlp1,Wlp,Th_fr_e_tel(Categ_n),Obs_fr_n_tel(Categ_n),
Test_x_2_tel(Categ_n)
19846     IMAGE /,8X,SZ.DD,3X," - ",X,SZ.DD,"(-)",6X,3D.DD,12X,3D,8X,3D.3D
19855     IF Pnr=1 THEN OUTPUT @Prt USING 19846:Wlp1,Wlp,Th_fr_e_tel(Categ_n),Ob
s_fr_n_tel(Categ_n),Test_x_2_tel(Categ_n)
19864   NEXT Categ_n
19873   PRINT USING 19882:Wlp,Im_r,Th_fr_e_tel(Categ_n),Obs_fr_n_tel(Categ_n),Te
st_x_2_tel(Categ_n)
19882   IMAGE /,8X,SZ.DD,3X," - ",X,SZ.DD.9X,3D.DD,12X,3D,8X,3D.3D
19891   IF Pnr=1 THEN OUTPUT @Prt USING 19882:Wlp,Im_r,Th_fr_e_tel(Categ_n),Obs_
fr_n_tel(Categ_n),Test_x_2_tel(Categ_n)
19900   '
19909   GOSUB Ektvpos1
19918
19927 END IF
19936 '
19945 GOSUB Carry_on
19954 '
19963 PRINT USING 19972
19972 IMAGE 4/,14X,"....................................................."
19981 IF Pnr=1 THEN OUTPUT @Prt USING 19972
19990 '
19999 REM!!!
```

```
20152    DATA 32.67,33.92,35.17,36.42,37.65,38.89,40.11,41.34,42.56,43.77
20161  NEXT I
20170  REM-----------------------
20179  IF Sss<=A(Dfr) THEN
20188    PRINT USING 20197:Dfr,A(Dfr)
20197    IMAGE 3/,"The Table A2 (Appendix A) gives :",2/,22X,"X^2(0.050,",2D,")
= ",2D.3D
20206    IF Pnr=1 THEN OUTPUT @Prt USING 20197;Dfr,A(Dfr)
20215    IF Dfr<=9 THEN
20224      PRINT USING 20233;Dfr
20233      IMAGE /,"Since :",2/,22X,"X^2  <=  X^2(0.050,",Z,")",2/,"it means that
 at the 5% level of significance the sample distribution is:"
20242      IF Pnr=1 THEN OUTPUT @Prt USING 20233;Dfr
20251    ELSE
20260      PRINT USING 20269;Dfr
20269      IMAGE /,"Since :",2/,22X,"X^2  <=  X^2(0.050,",2D,")",2/,"it means tha
t at the 5% level of significance the sample distribution is  :"
20278      IF Pnr=1 THEN OUTPUT @Prt USING 20269;Dfr
20287    END IF
20296    GOTO 20440
20305  ELSE     ' ( Sss>A(Dfr) )
20314    PRINT USING 20323:Dfr,A(Dfr)
20323    IMAGE 3/,"The Table A2 (Appendix A) gives :",2/,22X,"X^2(0.050,",2D,")
= ",2D.3D
20332    IF Pnr=1 THEN OUTPUT @Prt USING 20323:Dfr,A(Dfr)
20341    IF Dfr<=9 THEN
20350      PRINT USING 20359;Dfr
20359      IMAGE /,"Since :",2/,22X,"X^2  >=  X^2(0.050,",Z,")",2/,"it means that
 at the 5% level of significance the sample distribution is:"
20368      IF Pnr=1 THEN OUTPUT @Prt USING 20359;Dfr
20377    ELSE
20386      PRINT USING 20395;Dfr
20395      IMAGE /,"Since :",2/,22X,"X^2  >=  X^2(0.050,",2D,")",2/,"it means tha
t at the 5% level of significance the sample distribution is:"
20404      IF Pnr=1 THEN OUTPUT @Prt USING 20395;Dfr
20413    END IF
20422  END IF
20431  GOTO 20566
20440  REM-----------------------
20449  IF Answer$[1,1]="S" THEN
20458    PRINT USING 20467
20467    IMAGE /
20476    PRINT TAB(31);CHR$(130);"C O N S I S T E N T"
20485    PRINT CHR$(128)
20494    PRINT USING 20467
20503    IMAGE /
20512  ELSE     ' ( IF Answer$[1,2]="NS" )
20521    PRINT USING 20530
20530    IMAGE 2/,30X,"C O N S I S T E N T",2/
20539    IF Pnr=1 THEN OUTPUT @Prt USING 20530
20548  END IF
20557  GOTO 20667
20566  REM-----------------------
20575  IF Answer$[1,1]="S" THEN
20584    PRINT USING 20593
20593    IMAGE /
20602    PRINT TAB(26);CHR$(130);"N O T  C O N S I S T E N T"
20611    PRINT CHR$(128)
20620    PRINT USING 20593
20629    IMAGE /
```

```
20638 ELSE   ' ( IF Answer$[1,2]="PS" )
20647   PRINT USING 20656
20656   IMAGE 2/,25X,"N O T   C O N S I S T E N T ",2/
20665   IF Pnr=1 THEN OUTPUT @Prt USING 20656
20674 END IF
20683 REM-------------------------
20692 PRINT USING 20701;Menu$
20701 IMAGE "with the hypothesis that the parent distribution is ",27A
20710 IF Pnr=1 THEN OUTPUT @Prt USING 20701;Menu$
20719 IF Answer$[1,1]="S" THEN
20728   PRINT USING 20737
20737   IMAGE 5/,"*****************************************************************
*****************"
20746 END IF
20755 PRINT USING 20764
20764 IMAGE /
20773 '
20782 GOSUB Carry_on
20791 '
20800 RETURN
20809 '
20818 REM ////////%%%%%%//////%%%%%%                    //////%%%%%%//////%%%%%%
20827 '
20836 '
20845 REM=================================================================
20854 REM                    SABROUTINE     Classification
20863 REM ..................................................................
20872 REM
20881 STOP
20890 Classification:'
20899 '
20908 M=Res(1)
20917 FOR I=2 TO Obs
20926   IF Res(I)<M THEN
20935     M=Res(I)
20944   ELSE
20953     GOTO 20971
20962   END IF
20971 NEXT I
20980 Mn=Res(1)
20989 FOR I=2 TO Obs
20998   IF Res(I)<Mn THEN
21007     Mn=Res(I)
21016   ELSE
21025     GOTO 21043
21034   END IF
21043 NEXT I
21052 A1=0
21061 A2=0
21070 FOR I=-C1/2 TO -100 STEP -C1
21079   IF Mn>=I-.01 THEN
21088     I1=I
21097     GOTO 21124
21106   END IF
21115 NEXT I
21124 FOR I=C1/2 TO 100 STEP C1
21133   IF M>=I-.01 THEN
21142     I2=I
21151     GOTO 21178
21160   END IF
```

```
21169 NEXT I
21178 A1=I1
21187 A2=I2
21196 kmf=0
21205 Noinl=0
21214 Noinr=0
21223 As=0
21232 Sml1=0
21241 FOR I=I1 TO I2 STEP C1
21250   IF I>I2-.01 THEN
21259     GOTO 21826
21268   END IF
21277   IF I<0 THEN
21286     Noinl=Noinl+1
21295   ELSE
21304     Noinr=Noinr+1
21313   END IF
21322   G=0
21331   FOR J=1 TO Obs
21340     IF Res(J)<(I+C1 /2) AND Res(J)>=I-.01 THEN
21349       G=G+1
21358       New1(G)=Res(J)
21367     ELSE
21376       GOTO 21394
21385     END IF
21394   NEXT J
21402   kmf=kmf+1
21411   Mfoen(kmf)=G
21421   As=As+1
21430   Obs_fr_n(As)=G
21439   Obs_fr_n_draw(As)=Obs_fr_n(As)
21448   Sml1=Sml1+G
21457 NEXT I
21466 Max_mfoen=Mfoen(1)
21475 FOR I=2 TO kmf
21484   IF Mfoen(I)>Max_mfoen THEN
21493     Max_mfoen=Mfoen(I)
21502   ELSE
21511     GOTO 21529
21520   END IF
21529 NEXT I
21538 RETURN
21547 '
21556 REM ////%%%%%%/////%%%%%%                    //////%%%%%%/////%%%%%%
21565 '
21574 '
21583 REM=============================================================================
21592 REM                      SABROUTINE    Graph
21601 REM .....................................................................
21610 REM
21619 STOP
21628 Graph:'
21637@&-
21646 '
21655 Obs_fr_n_draw(Noinl+Noinr+1)=0
21664 IF Alekos=1 THEN
21673   GOTO 21700
21682 END IF
21691 REM;;;
```

```
21709 REM!!!
```

```
22240      LABEL USING 22249
22249      IMAGE "Residuals from data files :  ",#
22258      MOVE 170,190
22267      CSIZE 3,.5
22276      LABEL Code1$;" - ";Code2$
22285    ELSE
22294      MOVE 120,190
22303      CSIZE 3.2,.4
22312      LABEL USING 22321
22321      IMAGE "Residuals from data files :  ",#
22330      MOVE 170,190
22339      CSIZE 3,.5
22348      LABEL Ep1$(1);" - ";Ep2$(1)
22357      Kin=190
22366      FOR I=2 TO Mat
22375        Kin=Kin-7.5
22384        MOVE 170,Kin
22393        LABEL Ep1$(I);" - ";Ep2$(I)
22402      NEXT I
22411    END IF
22420  END IF
22429  VIEWPORT 5,130,10,70
22438  !
22447  GOSUB Parathiro
22456  !
22465  GOSUB Meg_akona_y
22474  !
22483  VIEWPORT 5,130,0,200
22492  WINDOW 0,125,0,200
22501  IF Me<>2 OR (Me=2 AND Wit=3) THEN
22510    Be=""
22519    De=6
22528  ELSE
22537    IF Me=2 AND Wit=1 THEN
22546      Ae=ABS(Tim_1-C1)-ABS(A1-C1)
22555      Be=Ae/C1
22564      De=0
22573    ELSE
22582      IF Me=2 AND Wit=2 THEN
22591        Ae=ABS(Tim_1-C1)-ABS(A1-C1)
22600        Be=Ae/C1
22609        Ce=(Tim_r+C1)-(A2+C1)
22618        De=Ce/C1
22627      ELSE
22636        IF Me=2 AND Wit=4 THEN
22645          Be=0
22654          Ce=(Tim_r+C1)-(A2+C1)
22663          De=Ce/C1
22672        END IF
22681      END IF
22690    END IF
22699  END IF
22708  X2=125/(Be*(Noin1+1)+(Noinr+1)+De)
22717  IF Me=3 THEN
22726    GOTO 22933
22735  END IF
22744  IF Alekos=1 THEN
22753    GOTO 22933
22762  END IF
22771  REM-----   ----------------
```

```
22240     LABEL USING 22249
22249     IMAGE "Residuals from data files :  ",#
22258     MOVE 170,190
22267     CSIZE 3,.5
22276     LABEL Code1$;" - ";Code2$
22285   ELSE
22294     MOVE 120,190
22303     CSIZE 3.2,.4
22312     LABEL USING 22321
22321     IMAGE "Residuals from  ata files :  ",#
22330     MOVE 170,190
22339     CSIZE 3,.5
22348     LABEL Ep1$(1);" - ";Ep2$(1)
22357     kin=190
22366     FOR I=2 TO Met
22375       kin=kin-7.5
22384       MOVE 170,kin
22393       LABEL Ep1$(I);" - ";Ep2$(I)
22402     NEXT I
22411   END IF
22420 END IF
22429 VIEWPORT 5,130,10,70
22438 !
22447 GOSUB Parathiro
22456 !
22465 GOSUB Meg_akona_v
22474 !
22483 VIEWPORT 5,130,0,200
22492 WINDOW 0,125,0,200
22501 IF Me<>2 OR (Me=2 AND Wit=3) THEN
22510   Be=0
22519   De=0
22528 ELSE
22537   IF Me=2 AND Wit=1 THEN
22546     Ae=ABS(Tim_1-C1)-ABS(A1-C1)
22555     Be=Ae/C1
22564     De=0
22573   ELSE
22582     IF Me=2 AND Wit=2 THEN
22591       Ae=ABS(Tim_1-C1)-ABS(A1-C1)
22600       Be=Ae/C1
22609       Ce=(Tim_r+C1)-(A2+C1)
22618       De=Ce/C1
22627     ELSE
22636       IF Me=2 AND Wit=4 THEN
22645         Be=0
22654         Ce=(Tim_r+C1)-(A2+C1)
22663         De=Ce/C1
22672       END IF
22681     END IF
22690   END IF
22699 END IF
22708 X2=125/(Be+(Noinl+1)+(Noinr+1)+De)
22717 IF Me=3 THEN
22726   GOTO 22933
22735 END IF
22744 IF Alekos=1 THEN
22753   GOTO 22933
22762 END IF
22771 REM------------------------
```

```
22780 LORG 5
22789 MOVE X2*(Be+Noinl+.5),+10
22798 IDRAW 0,-7
22807 MOVE X2*(Be+Noinl+.5-St_dev_o/C1),+10
22816 IDRAW 0,-3
22825 IMOVE 2*X2*(St_dev_o/C1),0
22834 IDRAW 0,+3
22843 IMOVE 2,-1.5
22852 IDRAW (-2-(1/3)*X2*(St_dev_o/C1)),0
22861 IMOVE (-(1/6)*X2*(St_dev_o/C1)),0
22870 LABEL "S"
22879 IMOVE (-(1/6)*X2*(St_dev_o/C1)),+6
22888 IDRAW (-(2/3)*X2*(St_dev_o/C1)),0
22897 IMOVE (-(1/6)*X2*(St_dev_o/C1)),0
22906 LABEL "S"
22915 IMOVE (-(1/6)*X2*(St_dev_o/C1)),+6
22924 IDRAW (-(1/3)*X2*(St_dev_o/C1)-2),0
22933 REM------------------------
22942 LORG 6
22951 IF Alekos=1 THEN
22960   St_1=Max_diff+ABS(Min_diff)+.8
22969   St=ABS(Min_diff-.4)*60/St_1+50
22978 ELSE
22987   St=+20
22996 END IF
23005 MOVE X2*(Be+Noinl+.5),St
23014 IF (Noinl+Noinr)<=17 THEN
23023   CSIZE 2.8,.5
23032 ELSE
23041   IF (Noinl+Noinr) 17 AND (Noinl+Noinr)<=25 THEN
23050     CSIZE 2.6,.3
23059   ELSE
23068     CSIZE 2.9,.2
23077   END IF
23086 END IF
23095 REM:::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::
23104 REM                                LABELS
23113 REM:::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::
23122 REM
23131 REM
23140 REM ------------------    LABEL X-AXIS    ----------------
23149 !
23158 !
23167 IF Me<>3 THEN
23176   LABEL "0"
23185 ELSE
23194   LABEL "X"
23203 END IF
23212 FOR I=X2*(Be+.5) TO X2*(Be+Noinl+.5-.01) STEP X2
23221   IF I=X2*(Be+.5) THEN
23230     MOVE I,St
23239     I1=I1-C1/2
23248     LABEL USING 23257;I1
23257     IMAGE 2Z.D
23266     I1=I1+C1
23275   ELSE
23284     MOVE I,St
23293     LABEL USING 23302;I1
23302     IMAGE 2Z.D
23311     I1=I1+C1
```

```
23320   END IF
23329 NEXT I
23338 I1=0
23347 FOR I=X2*(Be+Noin1+1.5) TO X2*(Be+Noin1+Noin+1.6) STEP X2
23356   IF I=X2*(Be+Noin1+1.5) THEN
23365     MOVE I,St
23374     LABEL USING 23383;C1
23383     IMAGE 2.D
23392     I1=2*C1
23401   ELSE
23410     MOVE I,St
23419     LABEL USING 23428;I1
23428     IMAGE 2.D
23437     I1=I1+C1
23446   END IF
23455 NEXT I
23464 I1=A1
23473 REM ------------------     LABEL Y-AXIS     ------------------
23482 '
23491 '
23500 VIEWPORT 5.130,10.70
23509 '
23518 GOSUB Parathiro
23527 '
23536 LORG 8
23545 CSIZE 2.5,.5
23554 '
23563 GOSUB Axonas_y
23572 '
23581 DEG
23590 LDIR 90
23599 VIEWPORT 5.170,0,200
23608 WINDOW 0,125,0,200
23617 CSIZE 2.5,.4
23626 IF Alekos=1 THEN
23635   MOVE 12*.28,St+60
23644   LABEL "Theor. - Obser."
23653   GOTO 26497
23662 ELSE
23671   MOVE 12*.18,120
23680   LABEL "No. of Residuals"
23689   GOTO 25939
23698 END IF
23707 REM                          %%%%%%%%%%%%%
23716 REM
23725 REM
23734 REM                  %%%%%%%%   PLOTTER    %%%%%%%%
23743 '
23752 '
23761 IF Alekos=1 THEN
23770   PRINT USING 23779
23779   IMAGE 9/,10X,"Put the   BLACK PEN   in the position of the   PEN 1 ."
23788   '
23797   GOSUB Carry_on
23806   '
23815   GOTO 24813
23824 END IF
23833 PRINT USING 23842
23842 IMAGE 6/,10X,"For the images of the results of the running program",2/,33X
,"S I X",2/,16X,  "different colours will be used to ally ."
```

```
23851 !
23860 GOSUB Carry_on
23869 !
23878 PRINT USING 23887
23887 IMAGE 5/,10X,"If your plotter has only  4  pens , read the following",/,10
X,"instructions ."
23896 PRINT USING 23905
23905 IMAGE /,10X,"Otherwise, (if there are more or less available pens -"
23914 PRINT USING 23923
23923 IMAGE 10X,"tions for the pens) you have to go through the program",/,10X,"
and to change the commands, which are referred for the",/,10X,"pens ."
23932 !
23941 GOSUB Carry_on
23950 !
23959 PRINT USING 23968
23968 IMAGE 4/,8X,"I suggest you that you choose the following pens for plotting
 ."
23977 PRINT USING 23986
23986 IMAGE 2/,29X,"PEN 1 :  Black colour",2/,29X,"PEN 2 :  Red colour",2/,29X,"
PEN 3 :  Green colour",2/,29X,"PEN 4 :  Blue colour"
23995 !
24004 GOSUB Carry_on
24013 !
24022 PLOTTER IS 705,"HPGL"
24031 GRAPHICS ON
24040 GCLEAR
24049 LINE TYPE 1,5
24058 PEN 1          !  Black pen
24067 VIEWPORT 3.134,9.86
24076 FRAME
24085 DEG
24094 LDIR 0
24103 WINDOW 0.130,10.100
24112 LORG 5
24121 IF (Code1$[1,1]="C" OR Code1$[1,1]="F" OR Code1$[1,1]="M") AND (Code2$[1,1
]="C" OR Code2$[1,1]="F" OR Code2$[1,1]="M") THEN
24130   CSIZE 2,.5
24139   IF Alekos=1 THEN
24148     St_1=Max_diff*ABS(Min_diff)*.8
24157     St=ABS(Min_diff-.4)*57/St_1*12
24166   ELSE
24175     St=14
24184   END IF
24193   MOVE 110,St
24202   LABEL "seconds"
24211   GOTO 24319
24220 ELSE
24229   CSIZE 2,.5
24238   IF Alekos=1 THEN
24247     St_1=Max_diff*ABS(Min_diff)*.8
24256     St=ABS(Min_diff-.4)*57/St_1*12
24265   ELSE
24274     St=14
24283   END IF
24292   MOVE 100,St
24301   LABEL "millimeters"
24310 END IF
24319 IF Alekos=1 THEN
24328   GOTO 24580
24337 ELSE
```

```
24346    IF Aa=1 THEN
24355      MOVE 90,95
24364      PEN 3    ' Green pen
24373      CSIZE 3,.5
24382      LABEL USING 24391
24391      IMAGE "Residuals from data files :  ",A
24400      MOVE 120,95
24409      CSIZE 2,.5
24418      LABEL Code1$;" - ";Code2$
24427    ELSE
24436      MOVE 90,95
24445      PEN 3    ' Green pen
24454      CSIZE 3,.5
24463      LABEL USING 24472
24472      IMAGE "Residuals from data files :  ",A
24481      MOVE 120,95
24490      CSIZE 2,.5
24499      LABEL Ep1$(1);" - ";Ep2$(1)
24508      kin=95
24517      FOR I=2 TO Met
24526        kin=kin-5
24535        MOVE 120,kin
24544        LABEL Ep1$(I);" - ";Ep2$(I)
24553      NEXT I
24562    END IF
24571  END IF
24580  PENUP
24589  VIEWPORT 8,120,17,74
24598  '
24607  GOSUB Parathiro
24616  '
24625  PEN 1      ' Black pen
24634  '
24643  GOSUB Meg_axona_v
24652  '
24661  VIEWPORT 8,120,0,100
24670  WINDOW 0,100,0,100
24679  IF Me>2 OR (Me=2 AND Wit=3) THEN
24688    Be=0
24697    De=0
24706  ELSE
24715    IF Me=2 AND Wit=1 THEN
24724      Ae=ABS(Tim_1-C1)-ABS(A1-C1)
24733      Be=Ae/C1
24742      De=0
24751    ELSE
24760      IF Me=2 AND Wit=2 THEN
24769        Ae=ABS(Tim_1-C1)-ABS(A1-C1)
24778        Be=Ae/C1
24787        Ce=(Tim_r+C1)-(A2+C1)
24796        De=Ce/C1
24805      ELSE
24814        IF Me=2 AND Wit=4 THEN
24823          Be=0
24832          Ce=(Tim_r+C1)-(A2+C1)
24841          De=Ce/C1
24850        END IF
24859      END IF
24868    END IF
24877  END IF
```

```
24886 X2=100/(Be+(Noinl+1)+(Noinr+1)+De)
24895 IF Me=3 THEN
24904   GOTO 25111
24913 END IF
24922 IF Alekos=1 THEN
24931   GOTO 25111
24940 END IF
24949 REM----------------------------
24958 LORG 5
24967 MOVE X2*(Be+Noinl+.5),+14
24976 IDRAW 0,-2
24985 MOVE X2*(Be+Noinl+.5-St_dev_o/C1),+14
24994 IDRAW 0,-2
25003 IMOVE 2*X2*(St_dev_o/C1),0
25012 IDRAW 0,+2
25021 IMOVE 1,-1
25030 IDRAW (-1-(1/2)*X2*(St_dev_o/C1)),0
25039 IMOVE (-(1/6)*X2*(St_dev_o/C1)),0
25048 LABEL "s"
25057 IMOVE (-(1/6)*X2*(St_dev_o/C1)),+2
25066 IDRAW (-(2/3)*X2*(St_dev_o/C1)),0
25075 IMOVE (-(1/6)*X2*(St_dev_o/C1)),0
25084 LABEL "s"
25093 IMOVE (-(1/6)*X2*(St_dev_o/C1)),+2
25102 IDRAW (-(1/2)*X2*(St_dev_o/C1)-1),0
25111 REM-- ---------------------
25120 LORG 6
25129 IF Alekos=1 THEN
25138   St_i=Max_diff+ABS(Min_diff)+.8
25147   St=ABS(Min_diff-.4)*57/St_i+16
25156 ELSE
25165   St=17
25174 END IF
25183 MOVE X2*(Be+Noinl+.5),St
25192 IF (Noinl+Noinr)<=17 THEN
25201   CSIZE 1.5,.5
25210 ELSE
25219   IF (Noinl+Noinr)>17 AND (Noinl+Noinr)<=25 THEN
25228     CSIZE 1.0,.2
25237   ELSE
25246     CSIZE 1.0,.2
25255   END IF
25264 END IF
25273 REM;;;
```

```
25426       I1=I1-C1/2
25435       LABEL USING 25444;I1
25444       IMAGE 2Z.D
25453       I1=I1+C1
25462     ELSE
25471       MOVE 1.5t
25480       LABEL USING 25489;I1
25489       IMAGE 2Z.D
25498       I1=I1+C1
25507     END IF
25516 NEXT I
25525 I1=0
25534 FOR I=X2*(Be+Noinl+1.5) TO X2*(Be+Noinl+Noinr+1.6) STEP X2
25543   IF I=X2*(Noinl+1.5) THEN
25552     MOVE I,5t
25561     LABEL USING 25570;C1
25570     IMAGE Z.D
25579     I1=2*C1
25588   ELSE
25597     MOVE I,5t
25606     LABEL USING 25615;I1
25615     IMAGE Z.D
25624     I1=I1+C1
25633   END IF
25642 NEXT I
25651 I1=A1
25660 REM ------------------     LABEL Y-AXIS     ------------------
25669 !
25678 !
25687 VIEWPORT 8.120,17,74
25696 !
25705 GOSUB Parathiro
25714 !
25723 LORG 8
25732 CSIZE 1.5,.5
25741 !
25750 GOSUB Axonas_y
25759 !
25768 DEG
25777 LDIR 90
25786 VIEWPORT 8.120,0,100
25795 WINDOW 0,100,0,100
25804 CSIZE 2,.5
25813 IF Alekos=1 THEN
25822   MOVE 12*.20,St+25
25831   LABEL "Theor. - Obser."
25840   PENUP
25849   GOTO 26497
25858 ELSE
25867   MOVE 2,55
25876   LABEL "No. of Residuals"
25885   GOTO 25939
25894 END IF
25903 PENUP
25912 REM                    %%%%%%%%%%%%%%%%%%%%
25921 REM
25930 REM
25939 REM:::::::::::::::::::     HISTOGRAMS     :::::::::::::::::::
25948 !
25957 !
```

```
25966 IF Ap$[1,1]="S" THEN
25975   VIEWPORT 5,130.10,70
25984   '
25993   GOSUB Parathiro
26002
26011 ELSE    ' ( IF Ap$[1,2]="PL" )
26020   VIEWPORT 8,120,17.74
26029   '
26038   GOSUB Parathiro
26047   '
26056   PEN 0
26065   PRINT USING 26074
26074   IMAGE 9/,10x,"Put the   ORANGE PEN   in the position of the   PEN 1 ,"
26083
26092   GOSUB Carry_on
26101   '
26110   PEN 1   '  Orange pen
26119 END IF
26128 Y=0
26137 FOR I=(-No1nl+.5)*(C1*100) TO No1nr*(C1*100) STEP C1*100
26146   MOVE I,0
26155   Y=Y+1
26164   IDRAW 0,Obs_fr_n_draw(Y)
26173   IDRAW (C1*100),0
26182   IDRAW 0,-Obs_fr_n_draw(Y)
26191 NEXT I
26200 '
26209 REM;;;
```

```
26506 '
26515 '
26524 IF Ao$(1,1)="S" THEN
26533   VIEWPORT 8,130,10,70
26542   '
26551   GOSUB Parathiro
26560   '
26569 ELSE    ' ( IF Ao$(1,2)="PL" )
26578   VIEWPORT 8,120,17,74
26587   '
26596   GOSUB Parathiro
26605   '
26614   PEN 1    '  Red pen
26623 END IF
26632 Car_1= 5-(A1+C1/2)
26641 Car_1= Car_1/2+(A1+C1/2))*100
26650 MOVE Car_1,Diff(1)
26659 Diff_2=ABS(Car_1)-ABS((A1+C1/2)*100)
26668 IF Diff(2)>0 THEN
26677   Diff_22=Diff(2)-Diff(1)
26686   IDRAW Diff_2,Diff_22
26695 ELSE
26704   Diff_22=ABS(Diff(2))+Diff(1
26713   IDRAW Diff_2,-Diff_22
26722 END IF
26731 Metr=1
26740 FOR I=-((No1n1-1)*C1*100) TO (No1nr)*(C1*100) STEP (C1*100)
26749   Metr=Metr+1
26758   IF Metr=(No1n1+No1nr+2) THEN
26767     GOTO 25615
26776   END IF
26785   IF I=-((No1n1-1)*C1*100) THEN
26794     MOVE I,Diff(Metr)
26803     GOTO 27064
26812   END IF
26821   IF (Diff(Metr-1)>0 AND Diff(Metr)>0) OR (Diff(Metr-1)<0 AND Diff(Metr)<0
) THEN
26830     Diff_1=Diff(Metr-1)-Diff(Metr)
26839     IF Diff_1>0 THEN
26848       IDRAW C1*100,-Diff_1
26857     ELSE
26866       IF Diff_1<0 THEN
26875         IDRAW C1*100,-Diff_1
26884       ELSE
26893         IDRAW C1*100,0
26902       END IF
26911     END IF
26920   ELSE
26929     IF (Diff(Metr-1)>0 AND Diff(Metr)<0) OR (Diff(Metr-1)<0 AND Diff(Metr)
>0) THEN
26938       Diff_1=ABS(Diff(Metr-1))+ABS(Diff(Metr))
26947       IF Diff(Metr-1)>0 AND Diff(Metr)<0 THEN
26956         IDRAW C1*100,-Diff_1
26965       ELSE
26974         IF Diff(Metr-1)<0 AND Diff(Metr)>0 THEN
26983           IDRAW C1*100,Diff_1
26992         ELSE
27000           IF ABS(Diff(Metr-1))=ABS(Diff(Metr)) THEN
27010             IDRAW C1*100,0
27019           END IF
```

```
26506 '
26515 '
26524 IF Ab$(1,1)="S" THEN
26533   VIEWPORT 5,130,10,70
26542   '
26551   GOSUB Parathiro
26560   '
26569 ELSE    ' ( IF Ab$(1,2)="PL" )
26578   VIEWPORT 8,120,17,74
26587   '
26596   GOSUB Parathiro
26605   '
26614   PEN 1    '  Red pen
26623 END IF
26632 Car_1= 5-(A1+C1/2)
26641 Car_1=(Car_1/2+(A1+C1/2))*100
26650 MOVE Car_1,Diff(1)
26659 Diff_2=ABS(Car_1)-ABS((A1+C1/2)*100)
26668 IF Diff(2)>0 THEN
26677   Diff_22=Diff(2)-Diff(1)
26686   IDRAW Diff_2,Diff_22
26695 ELSE
26704   Diff_22=ABS(Diff(2))+Diff(1)
26713   IDRAW Diff_2,-Diff_22
26722 END IF
26731 Metr=1
26740 FOR I=-((Noinl-1)*C1*100) TO (Noinr)*(C1*100) STEP (C1*100)
26749   Metr=Metr+1
26758   IF Metr=(Noinl+Noinr+2) THEN
26767     GOTO 25615
26776   END IF
26785   IF I>=-((Noinl-1)*C1*100) THEN
26794     MOVE 1,Diff(Metr)
26803     GOTO 27064
26812   END IF
26821   IF (Diff(Metr-1)>0 AND Diff(Metr)>0) OR (Diff(Metr-1)<0 AND Diff(Metr)<0
) THEN
26830     Diff_1=Diff(Metr-1)-Diff(Metr)
26839     IF Diff_1>0 THEN
26848       IDRAW C1*100,-Diff_1
26857     ELSE
26866       IF Diff_1<0 THEN
26875         IDRAW C1*100,-Diff_1
26884       ELSE
26893         IDRAW C1*100,0
26902       END IF
26911     END IF
26920   ELSE
26929     IF (Diff(Metr-1)>0 AND Diff(Metr)<0) OR (Diff(Metr-1)<0 AND Diff(Metr)
>0) THEN
26938       Diff_1=ABS(Diff(Metr-1))+ABS(Diff(Metr))
26947       IF Diff(Metr-1)>0 AND Diff(Metr)<0 THEN
26956         IDRAW C1*100,-Diff_1
26965       ELSE
26974         IF Diff(Metr-1)<0 AND Diff(Metr)>0 THEN
26983           IDRAW C1*100,Diff_1
26992         ELSE
27001           IF ABS(Diff(Metr-1))=ABS(Diff(Metr)) THEN
27010             IDRAW C1*100,0
27019           END IF
```

```
27028          END IF
27037        END IF
27046      END IF
27055    END IF
27064 NEXT I
27073 Car_2=+5-(A2-C1/2)
27082 Car_r=(Car_2/2+(A2-C1/2))*100
27091 Diff_2=Car_r-(A2-C1/2)*100
27100 IF Diff(Metr)<0 THEN
27109   Diff_22=Diff(Metr)-Diff(Metr+1)
27118   IDRAW Diff_2,-Diff_22
27127 ELSE
27136   Diff_22=ABS(Diff(Metr))+Diff(Metr+1)
27145   IDRAW Diff_2,Diff_22
27154 END IF
27163 PEN 0
27172 RETURN
27181 '
27190 REM//////%%%%%%//////%%%%%%                    //////%%%%%%//////%%%%%%
27199 '
27208 '
27217 REM=====================================================================
27226 REM                        SUBROUTINE    Arxise
27235 REM ..........................................................................
27244 REM
27253 STOP
27262 Arxise:'
27271 '
27280 '
27289 IF Ap$[1,1]="S" THEN
27298   Bnma=1.1
27307 ELSE
27316   LINE TYPE 1.5
27325   Bnma=1.0
27334 END IF
27343 RETURN
27352 '
27361 REM//////%%%%%%//////%%%%%%                    //////%%%%%%//////%%%%%%
27370 '
27379 '
27388 REM=====================================================================
27397 REM                    SUBROUTINE    Parathiro    '
27406 REM ..........................................................................
27415 REM
27424 STOP
27433 Parathiro:'
27442 '
27451 '
27460 IF Alekos=1 THEN
27469   IF Ms<>2 THEN
27478     WINDOW (A1-C1)*100,(A2+C1)*100,Min_diff-.4,Max_diff+.4
27487   ELSE
27496     IF Tim_l<(A1-C1) AND Tim_r<A2+C1 THEN
27505       WINDOW (Tim_l-C1)*100,(A2+C1)*100,Min_diff-.4,Max_diff+.4
27514     END IF
27523     IF Tim_l<(A1-C1) AND Tim_r>A2+C1 THEN
27532       WINDOW (Tim_l-C1)*100,(Tim_r+C1)*100,Min_diff-.4,Max_diff+.4
27541     END IF
27550     IF Tim_l>(A1-C1) AND Tim_r<A2+C1 THEN
27559       WINDOW (A1-C1)*100,(A2+C1)*100,Min_diff-.4,Max_diff+.4
```

```
27568      END IF
27577      IF Tim_l>(A1-C1) AND Tim_r<A2+C1 THEN
27586        WINDOW (A1-C1)*100,(Tim_r+C1)*100,Min_diff-.4,Max_diff+.4
27595      END IF
27604    END IF
27613  ELSE
27622    '
27631    Th_fr_e_max=Th_fr_e(1)
27640    FOR I=2 TO Metr
27649      IF Th_fr_e(I)>=Th_fr_e_max THEN
27658        Th_fr_e_max=Th_fr_e(I)
27667      ELSE
27676        GOTO 27694
27685      END IF
27694    NEXT I
27703    IF Th_fr_e_max >=Max_mfoen THEN
27712      Max_mfoen_tel=Th_fr_e_max
27721    ELSE
27730      Max_mfoen_tel=Max_mfoen
27739    END IF
27748    '
27757    IF Me<>2 THEN
27766      WINDOW (A1-C1)*100,(A2+C1)*100,0,Max_mfoen_tel+.4
27775    ELSE
27784      IF Tim_l<(A1-C1) AND Tim_r<A2+C1 THEN
27793        WINDOW (Tim_l-C1)*100,(A2+C1)*100,0,Max_mfoen_tel+.4
27802        Wit=1
27811      END IF
27820      IF Tim_l<(A1-C1) AND Tim_r>A2+C1 THEN
27829        WINDOW (Tim_l-C1)*100,(Tim_r+C1)*100,0,Max_mfoen_tel+.4
27838        Wit=2
27847      END IF
27856      IF Tim_l>(A1-C1) AND Tim_r<A2+C1 THEN
27865        WINDOW (A1-C1)*100,(A2+C1)*100,0,Max_mfoen_tel+.4
27874        Wit=3
27883      END IF
27892      IF Tim_l>(A1-C1) AND Tim_r>A2+C1 THEN
27901        WINDOW (A1-C1)*100,(Tim_r+C1)*100,0,Max_mfoen_tel+.4
27910        Wit=4
27919      END IF
27928    END IF
27937  END IF
27946  RETURN
27955  '
27964  REM//////%%%%%%//////%%%%%%                    //////%%%%%%//////%%%%%%
27973  '
27982  '
27991  REM=================================================================
28000  REM                    SUBROUTINE    Meg_axona_v
28009  REM ..................................................................
28018  REM
28027  STOP
28036  Meg_axona_v:'
28045  '
28054  '
28063  IF Alekos=1 THEN
28072    AXES C1*100/2,1
28081    GOTO 28414
28090  END IF
28099  IF Max_mfoen_tel<=10 THEN
```

```
28108   AXES C1*100/2.1
28117 ELSE
28126   IF Max_mfoen_tel>10 AND Max_mfoen_tel<=20 THEN
28135     AXES C1*100/2.2
28144   ELSE
28153     IF Max_mfoen_tel>20 AND Max_mfoen_tel<=100 THEN
28162       AXES C1*100/2.5
28171     ELSE
28180       IF Max_mfoen_tel>100 AND Max_mfoen_tel<=200 THEN
28189         AXES C1*100/2.10
28198       ELSE
28207         IF Max_mfoen_tel>200 AND Max_mfoen_tel<=500 THEN
28216           AXES C1*100/2.25
28225         ELSE
28234           IF Max_mfoen_tel>500 AND Max_mfoen_tel<=1000 THEN
28243             AXES C1*100/2.50
28252           ELSE
28261             IF Max_mfoen_tel>1000 AND Max_mfoen_tel<=2000 THEN
28270               AXES C1*100/2.100
28279             ELSE
28288               IF Max_mfoen_tel>2000 AND Max_mfoen_tel<=10000 THEN
28297                 AXES C1*100/2.500
28306               ELSE
28315                 IF Max_mfoen_tel>10000 THEN
28324                   AXES C1*100/2.1000
28333                 END IF
28342               END IF
28351             END IF
28360           END IF
28369         END IF
28378       END IF
28387     END IF
28396   END IF
28405 END IF
28414 RETURN
28423 '
28432 REM//////%%%%%%//////%%%%%%                    //////%%%%%%//////%%%%%%
28441 '
28450 '
28459 REM=========================== ==========================================
28468 REM                    SUBROUTINE     Axonas_v
28477 REM ..................................................................
28486 REM
28495 STOP
28504 Axonas_v:'
28513 '
28522 '
28531 IF Alekos=1 THEN
28540   FOR I=1 TO Max_diff
28549     MOVE 0,I
28558     LABEL I
28567   NEXT I
28576   FOR I=-1 TO Min_diff STEP -1
28585     MOVE 0,I
28594     LABEL I
28603   NEXT I
28612   GOTO 29188
28621 END IF
28630 IF Max_mfoen_tel<=10 THEN
28639   FOR I=1 TO Max_mfoen_tel
```

```
28648       MOVE 0,I
28657       LABEL I
28666     NEXT I
28675   ELSE
28684     IF Max_mfoen_tel>10 AND Max_mfoen_tel<=20 THEN
28693       FOR I=2 TO Max_mfoen_tel STEP 2
28702         MOVE 0,I
28711         LABEL I
28720       NEXT I
28729     ELSE
28738       IF Max_mfoen_tel>20 AND Max_mfoen_tel<=100 THEN
28747         FOR I=5 TO Max_mfoen_tel STEP 5
28756           MOVE 0,I
28765           LABEL I
28774         NEXT I
28783       ELSE
28792         IF Max_mfoen_tel>100 AND Max_mfoen_tel<=200 THEN
28801           FOR I=10 TO Max_mfoen_tel STEP 10
28810             MOVE 0,I
28819             LABEL I
28828           NEXT I
28837         ELSE
28846           IF Max_mfoen_tel>200 AND Max_mfoen_tel<=500 THEN
28855             FOR I=25 TO Max_mfoen_tel STEP 25
28864               MOVE 0,I
28873               LABEL I
28882             NEXT I
28891           ELSE
28900             IF Max_mfoen_tel>500 AND Max_mfoen_tel<=1000 THEN
28909               FOR I=50 TO Max_mfoen_tel STEP 50
28918                 MOVE 0,I
28927                 LABEL I
28936               NEXT I
28945             ELSE
28954               IF Max_mfoen_tel>1000 AND Max_mfoen_tel<=2000 THEN
28963                 FOR I=100 TO Max_mfoen_tel STEP 100
28972                   MOVE 0,I
28981                   LABEL I
28990                 NEXT I
28999               ELSE
29008                 IF Max_mfoen_tel>2000 AND Max_mfoen_tel<=10000 THEN
29017                   FOR I=500 TO Max_mfoen_tel STEP 500
29026                     MOVE 0,I
29035                     LABEL I
29044                   NEXT I
29053                 ELSE
29062                   IF Max_mfoen_tel>10000 THEN
29071                     FOR I=1000 TO Max_mfoen_tel STEP 1000
29080                       MOVE 0,I
29089                       LABEL I
29098                     NEXT I
29107                   END IF
29116                 END IF
29125               END IF
29134             END IF
29143           END IF
29152         END IF
29161       END IF
29170     END IF
29179   END IF
```

```
29188 RETURN
29197 '
29206 REM//////%%%%%%//////%%%%%%                    //////%%%%%%//////%%%%%%
29215 '
29224 '
29233 REM==========================================================================
29242 REM                        SUBROUTINE    Emo
29251 REM ..........................................................................
29260 REM
29269 STOP
29278 Emo:'
29287 '
29296 '
29305 Metr=Metr+1
29314 Th_rel_fr(Metr)=Area
29323 Th_fr_e(Metr)=Area*Obs
29332 Ss=Ss+Th_fr_e(Metr)
29341 Obs_fr_n(Metr)=0
29350 Smil=Smil+0
29359 D.ff(Metr)=Th_fr_e(Metr)-Obs_fr_n(Metr)
29368 Test_2=(Obs_fr_n(Metr)-Th_fr_e(Metr))^2/Th_fr_e(Metr)
29377 Sss=Sss+Test^2
29386 PRINT USING 29395;Th_fr_e(Metr),Obs_fr_n(Metr)
29395 IMAGE 5:X,D.DD,13X,Z
29404 IF Fnr=1 THEN OUTPUT @Prt USING 29395;Th_fr_e(Metr),Obs_fr_n(Metr)
29413 RETURN
29422 '
29431 REM//////%%%%%%//////%%%%%%                    //////%%%%%%//////%%%%%%
29440 '
29449 '
29458 REM==========================================================================
29467 REM                        SUBROUTINE      Topographos_1
29476 REM ..........................................................................
29485 REM
29494 STOP
29503 Topographos_1:'
29512 '
29521 '
29530 Metr=Metr+1
29539 Th_rel_fr(Metr)=Area
29548 Th_fr_e(Metr)=Area*Obs
29557 IF Me=3 THEN
29566   IF I<=Mo_inv AND Mo_inv<=I+C1 THEN
29575     Th_fr_e_mean=Th_fr_e(Metr)
29584   ELSE
29593     GOTO 29620
29602   END IF
29611 END IF
29620 Ss=Ss+Th_fr_e(Metr)
29629 G=0
29638 RETURN
29647 '
29656 REM//////%%%%%%//////%%%%%%                    //////%%%%%%//////%%%%%%
29665 '
29674 '
29683 REM==========================================================================
29692 REM                        SUBROUTINE    Topographos_2
29701 REM ..........................................................................
29710 REM
29719 STOP
```

```
29728 Topographos_2:'
29737 '
29746 '
29755 IF Me<>3 THEN
29764   FOR M=1 TO Obs
29773     IF Res(M)<(I+C1-.01) AND Res(M)>=(I-.01) THEN
29782       G=G+1
29791       New1(G)=Res(M)
29800     ELSE
29809       GOTO 29827
29818     END IF
29827   NEXT M
29836 ELSE
29845   FOR M=1 TO Obs
29854     IF Res_inv(M)<(I+C1-.01) AND Res_inv(M)>=(I-.01) THEN
29863       G=G+1
29872       New1(G)=Res_inv(M)
29881     ELSE
29890       GOTO 29908
29899     END IF
29908   NEXT M
29917 END IF
29926 RETURN
29935 '
29944 REM//////%%%%%%//////%%%%%%                    //////%%%%%%//////%%%%%%
29953 '
29962 '
29971 REM=================================================================
29980 REM                    SUBROUTINE     Topographos_3
29989 REM ..................................................................
29998 REM
30007 STOP
30016 Topographos_3:'
30025 '
30034 '
30043 Kmf=Kmf+1
30052 Mfoen(Kmf)=G
30061 Obs_fr_n(Metr)=G
30070 Sm11=Sm11+G
30079 Diff(Metr)=Th_fr_e(Metr)-Obs_fr_n(Metr)
30088 Test_x_2=(Obs_fr_n(Metr)-Th_fr_e(Metr))^2/Th_fr_e(Metr)
30097 Sss=Sss+Test_x_2
30106 IF G=0 THEN
30115   PRINT USING 30124;Th_fr_e(Metr),Obs_fr_n(Metr)
30124   IMAGE 49X,3D,DD,13X,Z
30133   IF Pnr=1 THEN OUTPUT @Prt USING 30124;Th_fr_e(Metr),Obs_fr_n(Metr)
30142 ELSE
30151   FOR N=1 TO G
30160     IF N<>G THEN
30169       PRINT USING 30178;New1(N)
30178       IMAGE 33X,SZ,D
30187       IF Pnr=1 THEN OUTPUT @Prt USING 30178;New1(N)
30196     ELSE
30205       PRINT USING 30214;New1(N),Th_fr_e(Metr),Obs_fr_n(Metr)
30214       IMAGE 33X,SZ,D,12X,3D,DD,11X,3D
30223       IF Pnr=1 THEN OUTPUT @Prt USING 30214;New1(N),Th_fr_e(Metr),Obs_fr_n
(Metr)
30232     END IF
30241   NEXT N
30250 END IF
```

```
30259 RETURN
30268 !
30277 REM//////%%%%%%//////  %%%%%%                    //////%%%%%%//////%%%%%%
30286 !
30295 !
30304 REM*************************************************************************
30313 REM                        SUBROUTINE    Erotis:
30322 REM ....... ....................................................................
30331 REM
30340 STOP
30349 Erotis:!
30358 !
30367 !
30376 DISP "Do you want the values for the coefficients of SKEWNESS and KURTOSIS
 ? (Y/N)";
30385 INPUT Erot$
30394 IF Erot$(1,1)="Y" THEN
30403   IF Answer$(1,2)="PS" THEN
30412     IF Me=7 THEN
30421       GOTO 30484
30430     END IF
30439     PRINT USING 30448
30448     IMAGE 4/,"%%%%%%
```

```
30761   ELSE   '  ( Me=3 )
30790     Svn_2=Svn_2+Res_1_inv(I)^2
30799     Svn_3=Svn_3+Res_1_inv(I)^3
30808     Svn_4=Svn_4+Res_1_inv(I)^4
30817   END IF
30826   IF I=Obs THEN
30835     GOTO 30880
30844   ELSE
30853     GOTO 30871
30862   END IF
30871 NEXT I
30880 Mo_2=Svn_2/Obs
30889 Mo_3=Svn_3/Obs
30898 Mo_4=Svn_4/Obs
30907 RETURN
30916 '
30925 REM//////%%%%%%//////%%%%%%                    //////%%%%%%//////%%%%%%
30934 '
30943 '
30952 REM=================================================================
30961 REM                    SUBROUTINE    Eltypcsi
30970 REM ..................................................................
30979 REM
30988 STOP
30997 Eltypcsi:'
31006 '
31015 '
31024 IF Obs<100 THEN
31033   PRINT USING 31042;Ss,Sm11,Sss
31042   IMAGE /,33X,"---------",9X,"------",6X,"---------",/,35X,2D,2D,13X,2D,8X
,3D,3D
31051   IF Pnr=1 THEN OUTPUT @Prt USING 31042;Ss,Sm11,Sss
31060 ELSE
31069   IF Obs<=100 AND Obs<1000 THEN
31078     PRINT USING 31087;Ss,Sm11,Sss
31087     IMAGE /,33X,"---------",9X,"------",6X,"---------",/,34X,3D,2D,12X,3D,
8X,3D,3D
31096     IF Pnr=1 THEN OUTPUT @Prt USING 31087;Ss,Sm11,Sss
31105   ELSE
31114     PRINT USING 31123;Ss,Sm11,Sss
31123     IMAGE /,33X,"---------",9X,"------",6X,"---------",/,33X,4D,2D,11X,4D,
8X,3D,3D
31132     IF Pnr=1 THEN OUTPUT @Prt USING 31123;Ss,Sm11,Sss
31141   END IF
31150 END IF
31159 RETURN
31168 '
31177 REM//////%%%%%%//////%%%%%%                    //////%%%%%%//////%%%%%%
31186 '
31195 '
31204 REM ##################################################################
31213 REM
31222 REM
31231 REM=================================================================
31240 REM                                E   N   D
31249 REM ..................................................................
31258 '
31267 '
31276 MOVE 0,0
31285 MOVE 40,40
```

```
31294 PEN 1
31303 IDRAW -15.0
31312 IDRAW 0.20
31321 IDRAW 15.0
31330 PEN -1
31339 IDRAW -15.-10
31348 PEN 1
31357 IDRAW 5.0
31366 PEN -1
31375 IDRAW 25.-10
31384 PEN 1
31393 IDRAW 0.20
31402 IDRAW 15.-20
31411 IDRAW 0.20
31420 PEN -1
31429 IDRAW 15.-20
31438 PEN 1
31447 IDRAW 0.20
31456 IDRAW 10.0
31465 IDRAW 5.-4
31474 IDRAW 0.-12
31483 IDRAW -5.-4
31492 IDRAW -10.0
31501 WAIT 2
31510 GCLEAR
31519 REM------------------------------------------------------------------------
31528 REM
31537 REM
31546 REM========================================================================
31555 REM                              CLOSE PATHS
31564 REM ..... .....
31573 '
31582 '
31591 ASSIGN @Frt TO *
31600 ASSIGN @Top TO *
31609 ASSIGN @Res TO *
31618 '
31627 '
31636 END
```

Author Albanis Alexander
Name of thesis The Distributions Of Theodolite Observations Associated Withopen Pit Monitoring Surveys. 1987

PUBLISHER:
University of the Witwatersrand, Johannesburg
©2013

LEGAL NOTICES:

Copyright Notice: All materials on the University of the Witwatersrand, Johannesburg Library website are protected by South African copyright law and may not be distributed, transmitted, displayed, or otherwise published in any format, without the prior written permission of the copyright owner.

Disclaimer and Terms of Use: Provided that you maintain all copyright and other notices contained therein, you may download material (one machine readable copy and one print copy per page) for your personal and/or educational non-commercial use only.

The University of the Witwatersrand, Johannesburg, is not responsible for any errors or omissions and excludes any and all liability for any errors in or omissions from the information on the Library website.