

บรรณานุกรม

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ประเภทที่ ๑ จากข้อมูลที่ผ่านขั้นตอนเบื้องต้นของการเปรียบเทียบพหุคูณ."

วิทยานิพนธ์ปริญญาโทบัณฑิต ภาควิชาวิจัยการศึกษา บัณฑิตวิทยาลัย

จุฬาลงกรณ์มหาวิทยาลัย, 2525.

ศูนย์วิทยทรัพยากร
จุฬาลงกรณ์มหาวิทยาลัย



ศูนย์วิทยทรัพยากร
จุฬาลงกรณ์มหาวิทยาลัย

ภาคผนวก ก.การคำนวณช่วงความเชื่อมั่นของอัตราความคลาดเคลื่อนที่ระบุ (T)

วิธีคำนวณเกณฑ์ในการตัดสินใจอัตราความคลาดเคลื่อนที่ระบุ (nominated) ซึ่งสามารถคำนวณจากช่วงความเชื่อมั่นของ p เมื่อ p หมายถึงโอกาสที่เกิดจากความคลาดเคลื่อนประเภทที่ 1 ดังนี้

$$\hat{p} - z_{\alpha/2} \sqrt{\frac{\hat{p}\hat{q}}{n}} \leq p \leq p + z_{\alpha/2} \sqrt{\frac{\hat{p}\hat{q}}{n}}$$

เมื่อ $\alpha = .05$ ได้ว่า $\hat{p} = .05$ $\hat{q} = 1 - \hat{p} = .95$, $n = 1,000$ และ $z_{\alpha/2} = 1.96$

เพราะฉะนั้น

$$.05 - 1.96 \times \sqrt{\frac{(.05)(.95)}{1000}} \leq p \leq .05 + 1.96 \times \sqrt{\frac{(.05)(.95)}{1000}}$$

$$.05 - .0135083 \leq p \leq .05 + .0135083$$

$$0.0364917 \leq p \leq 0.0635083$$

เมื่อ $\alpha = .01$ ได้ว่า $\hat{p} = .01$, $\hat{q} = .99$, $n = 1,000$, $z_{\alpha/2} = 2.576$

เพราะฉะนั้น

$$.01 - 2.576 \sqrt{\frac{(.01)(.99)}{1000}} \leq p \leq .01 + 2.576 \sqrt{\frac{(.01)(.99)}{1000}}$$

$$.0081051 \leq p \leq .0181051$$

สรุปช่วงของความเชื่อมั่นสำหรับ $p = .05$ คือ $.036 \leq p \leq .064$

$p = .01$ คือ $.008 \leq p \leq .018$

หมายเหตุ เกณฑ์ของโคแรมกำหนดช่วงของความเชื่อมั่นดังนี้

สำหรับ $p = .05$ คือ $.040 \leq p \leq .060$

$p = .01$ คือ $.007 \leq p \leq .015$

เพราะเหตุที่เกณฑ์ของโคแรนนั้นเป็นช่วงที่สั้นกว่าช่วงความเชื่อมั่นที่คำนวณได้ และ Ramsey ได้ใช้เกณฑ์ของโคแรนในการตัดสินใจอัตราความคลาดเคลื่อนประเภทที่ 1 ของการทดสอบที่ การวิจัยครั้งนี้จึงเลือกใช้เกณฑ์ของโคแรนตัดสินใจการเปรียบเทียบอัตราความคลาดเคลื่อนประเภทที่ 1 จากผลการทดลองกับอัตราความคลาดเคลื่อนที่ระบุ

การทดสอบความแตกต่างกันของสัดส่วนของอำนาจของการทดสอบ

ทำการทดสอบความแตกต่างอย่างมีนัยสำคัญทางสถิติของสัดส่วนของอำนาจของการทดสอบด้วยการทดสอบซี (Z-test) และ เนื่องจากทดลองนี้ทำการซิมูเลชันเพียง 1,000 ครั้ง เพื่อประหยัดการทำงานของเครื่องคอมพิวเตอร์จึงกำหนดอัตราความคลาดเคลื่อนที่ระบุสำหรับการทดสอบซีเท่ากับ .10

ทดสอบความแตกต่างอย่างมีนัยสำคัญของอำนาจของการทดสอบของ t-(NN,5) กับ w-(NN,5), T-(NN,5), v-(NN,5) เมื่อเดลต้ามีค่าเท่ากับ 0.25σ และกำหนดอัตราความคลาดเคลื่อนที่ระบุ .05

$$\text{จากสูตร} \quad Z = \frac{\hat{p}_1 - \hat{p}_2}{\sqrt{\frac{\hat{p}_1 \hat{q}_1}{n_1} + \frac{\hat{p}_2 \hat{q}_2}{n_2}}}$$

เมื่อ \hat{p}_1 คือสัดส่วนของอำนาจของการทดสอบของ t-(NN,5)

\hat{p}_2 คือสัดส่วนของอำนาจของการทดสอบของ w-(NN,5)

\hat{q}_1 คือ $(1-\hat{p}_1)$

n_1 คือจำนวนครั้งของการทดลองหาค่าของอำนาจของการทดสอบของ t-(NN,5)

n_2 คือจำนวนครั้งของการทดลองหาค่าของอำนาจของการทดสอบของ w-(NN,5)

$$\begin{aligned} \therefore Z &= \frac{0.069 - 0.063}{\sqrt{\frac{(.069)(.931)}{1000} + \frac{(.063)(.937)}{1000}}} \\ &= 0.5404089 \end{aligned}$$

ไม่มีเหตุผลเพียงพอที่จะสรุปว่า อำนาจของการทดสอบของ t -(NN,5), w -(NN,5), T -(NN,5), V -(NN,5) ณ จุดนี้แตกต่างกันอย่างมีนัยสำคัญทางสถิติที่ระดับ .10 นั่นคือที่เดลต้ามีค่าเท่ากับ 0.25σ และกำหนดอัตราความคลาดเคลื่อนที่ระบุ .05 การทดสอบของ t -(NN,5), w -(NN,5) และ T -(NN,5) มีอำนาจของการทดสอบใกล้เคียงกัน

ทดสอบความแตกต่างอย่างมีนัยสำคัญของอำนาจของการทดสอบของ t -(NN,10) กับ T -(NN,10) เมื่อเดลต้ามีค่าเท่ากับ 1.25σ และกำหนดอัตราความคลาดเคลื่อนที่ระบุ .01

จากสูตร

$$Z = \frac{\hat{p}_1 - \hat{p}_2}{\sqrt{\frac{\hat{p}_1\hat{q}_1}{n_1} + \frac{\hat{p}_2\hat{q}_2}{n_2}}}$$

$$\therefore Z = \frac{0.491 - 0.401}{\sqrt{\frac{(.491)(.509)}{1000} + \frac{(.401)(.599)}{1000}}}$$

$$= 4.0652961$$

สรุปได้ว่าอำนาจของการทดสอบของ t -(NN,10) และ T -(NN,10) ณ จุดนี้แตกต่างกันอย่างมีนัยสำคัญทางสถิติที่ระบุ .05 นั่นคือที่เดลต้ามีค่าเท่ากับ 1.25σ และกำหนดอัตราความคลาดเคลื่อนที่ระบุ .01 t -(NN,10) มีอำนาจของการทดสอบเหนือกว่า T -(NN,10)

DCS FORTRAN IV 360N-F0-4/9 3-9

MAINPGM

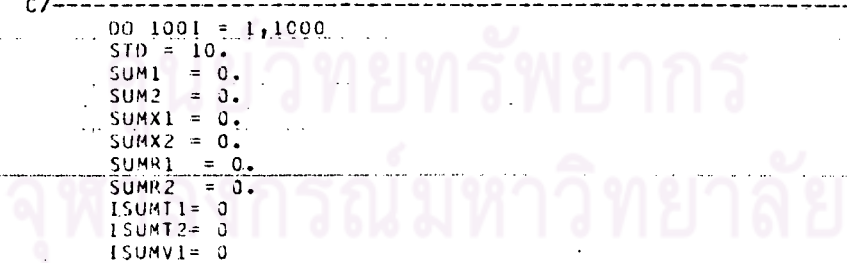
DATE 12/03/83

TIME 02.03.53

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C *****
C *
C *
C * THE COMPUTER PROGRAM, USED IN THIS STUDY IS
C * WRITTEN IN FORTRAN IV. IT IS DESIGNED TO COMPUTE
C * THE ACTUAL TYPE I ERROR WHEN DELTA IS 0.0 BESIDES
C * COMPUTING THE POWER OF TESTS WHEN DELTA'S ARE 0.25S.D.,
C * 0.5S.D., 0.75S.D., 1.0S.D., 1.25S.D. AND 1.75S.D. AND THE
C * POPULATION VARIANCES ARE 100.
C *
C *
C *****
C *
C *
C * NN : SAMPLE SIZE(N1) = 5
C *
C *****
C
C DISCUPTION OF PARAMTERS
C N1 = SAMPLE SIZE FORM POPULATION 1.
C N2 = SAMPLE SIZE FORM POPULATION 2.
C EX = MEAN OF POPULATION
C STD= STANDARD DEVIATION OF POPULATION
C EV = THE EXPECTED NORMAL SCORE
C ZI = THE INVERSE-NORMAL SCORE
C
0001 DIMENSION NODAT(10),RR(10),R(10),EV(10),ZI(10),IEV(10),
*IZI(10)
0002 COMMON IA
0003 REAL NODAT,N1,N2,MEAN1,MEAN2
0004 N1 = 5
0005 N2 = 5
0006 Y = 0.
C/-----/
0007 DO 2000KKK = 1,8
0008 IA = 65539
0009 CTT05 = 0.
0010 CTT01 = 0.
0011 CWIN05 = 0.
0012 CWIN01 = 0.
0013 CTER05 = 0.
0014 CTER01 = 0.
0015 CVAN05 = 0.
0016 CVAN01 = 0.
C/-----/
0017 DO 1001 = 1,1000
0018 STD = 10.
0019 SUM1 = 0.
0020 SUM2 = 0.
0021 SUMX1 = 0.
0022 SUMX2 = 0.
0023 SUMR1 = 0.
0024 SUMR2 = 0.
0025 ISUMT1= 0
0026 ISUMT2= 0
0027 ISUMV1= 0
0028 ISUMV2= 0
0029 GO TO (19,12,13,14,15,16,17,18),KKK
C THIS IS DESIGNED TO COMPUTE THE ACTUAL TYPE I ERROR
C WHEN DELTA IS 0.05.D.
0030 19 EX = 500.
0031 GO TO 20
C THIS IS DESIGNED TO COMPUTE THE POWER OF TESTS
C WHEN DELTA IS 0.25S.D.
0032 12 EX = 502.5
0033 GO TO 20
C THIS IS DESIGNED TO COMPUTE THE POWER OF TESTS
C WHEN DELTA IS 0.5S.D.
0034 13 EX = 505.0
0035 GO TO 20

```



```

C      THIS IS DESIGNED TO COMPUTE THE POWER OF TESTS
C      WHEN DELTA IS 0.75S.D.
0036 14 EX = 507.5
0037      GO TO 20
C      THIS IS DESIGNED TO COMPUTE THE POWER OF TESTS
C      WHEN DELTA IS 1.0S.D.
0038 15 EX = 510.0
0039      GO TO 20
C      THIS IS DESIGNED TO COMPUTE THE POWER OF TESTS
C      WHEN DELTA IS 1.25S.D.
0040 16 EX = 512.5
0041      GO TO 20
C      THIS IS DESIGNED TO COMPUTE THE POWER OF TESTS
C      WHEN DELTA IS 1.50S.D.
0042 17 EX = 515.0
0043      GO TO 20
C      THIS IS DESIGNED TO COMPUTE THE POWER OF TESTS
C      WHEN DELTA IS 1.75S.D.
0044 18 EX = 517.5
0045 20 DO 10J = 1,5
0046      IF(Y.NE.0.)GO TO 21
0047      CALL NCRMAL(EX,STD,X,Y)
0048      GO TO 10
0049 21 X = Y
0050      Y = 0.
0051 10 NODAT(J) = X
0052      EX = 500.
0053      DO 11X = 6,10
0054      IF(Y.NE.0.)GO TO 22
0055      CALL NCRMAL(EX,STD,X,Y)
0056      GO TO 11
0057 22 X = Y
0058      Y = 0.
0059 11 NODAT(IX) = X
C/-----T-TEST-----/
0060      DO 11Q = 1,5
0061 1 SUM1 = SUM1+NODAT(1Q)
0062      MEAN1 = SUM1/N1
0063      DO 2JC = 1,5
0064 3 SUM2 = SUM2+(NODAT(2J)-MEAN1)**2
0065      DO 2IB = 6,10
0066 2 SUMX1 = SUMX1+NODAT(1B)
0067      MEAN2 = SUMX1/N2
0068      DO 2KQ = 6,10
0069 9 SUMX2 = SUMX2+(NODAT(2K)-MEAN2)**2
0070      XX = (SUM2+SUMX2)/(N1+N2-2.)*(.1./N1+.1./N2)
0071      TTEST = (MEAN1-MEAN2)/SQRT(XX)
0072      TTEST = ABS(TTEST)
0073      IF(TTEST.GE.2.306) CT105 = CT105+1
0074      IF(TTEST.GE.3.355) CT101 = CT101+1
C/-----WILCOXON-----/
0075      N = 10
0076      CALL RANK(NODAT,R,N)
0077      DO 3K = 1,10
0078 3 RR(K) = R(K)
0079      DO 4L = 1,5
0080 4 SUMR1 = SUMR1+RR(L)
0081      DO 5M = 6,10
0082 5 SUMR2 = SUMR2+RR(M)
0083      IF(SUMR1.LT.SUMR2) GO TO 6
0084      TR1 = SUMR2
0085      GO TO 7
0086 6 TR1 = SUMR1
0087 7 IF(TR1.LE.13.0) CWIN05 = CWIN05+1
0088      IF(TR1.LE.15.0) CWIN01 = CWIN01+1
C/-----TERRY-HDEFFDING-----/
0089      DO 30IJ = 1,10
0090      IF(RR(IJ).EQ.1.) IEV(IJ) = -154
0091      IF(RR(IJ).EQ.2.) IEV(IJ) = -100
0092      IF(RR(IJ).EQ.3.) IEV(IJ) = -66
0093      IF(RR(IJ).EQ.4.) IEV(IJ) = -33
0094      IF(RR(IJ).EQ.5.) IEV(IJ) = -12
0095      IF(RR(IJ).EQ.6.) IEV(IJ) = 12
0096      IF(RR(IJ).EQ.7.) IEV(IJ) = 33
0097      IF(RR(IJ).EQ.8.) IEV(IJ) = 66
0098      IF(RR(IJ).EQ.9.) IEV(IJ) = 100
0099      IF(RR(IJ).EQ.10.)IEV(IJ) = 154
0100 30 CONTINUE

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0101      DO 31IK = 1,5
0102      31 ISUMT1 = ISUMT1+IEV(IK)
0103      DO 32IN = 6,10
0104      32 ISUMT2 = ISUMT2+IEV(IN)
0105      IF(ISUMT1.GT.ISUMT2) GO TO 33
0106      IT1 = ISUMT2
0107      GO TO 34
0108      33 IT1 = ISUMT1
0109      34 IF(IT1.GE.292) CTERO5 = CTERO5+1
0110      IF(IT1.EQ.370) CTERO1 = CTERO1+1
C/-----VAN DER WAERDEN-----/
0111      DO 50JJ = 1,10
0112      IF(RR(JJ).EQ.1.) IZ1(JJ) = -134
0113      IF(RR(JJ).EQ.2.) IZ1(JJ) = -91
0114      IF(RR(JJ).EQ.3.) IZ1(JJ) = -60
0115      IF(RR(JJ).EQ.4.) IZ1(JJ) = -35
0116      IF(RR(JJ).EQ.5.) IZ1(JJ) = -11
0117      IF(RR(JJ).EQ.6.) IZ1(JJ) = 11
0118      IF(RR(JJ).EQ.7.) IZ1(JJ) = 35
0119      IF(RR(JJ).EQ.8.) IZ1(JJ) = 60
0120      IF(RR(JJ).EQ.9.) IZ1(JJ) = 91
0121      IF(RR(JJ).EQ.10.) IZ1(JJ) = 134
0122      50 CONTINUE
0123      DO 51LL = 1,5
0124      51 ISUMV1 = ISUMV1+IZ1(LL)
0125      DO 52MM = 6,10
0126      52 ISUMV2 = ISUMV2+IZ1(MM)
0127      IF(ISUMV1.GT.ISUMV2) GO TO 53
0128      ITV1 = ISUMV2
0129      GO TO 54
0130      53 ITV1 = ISUMV1
0131      54 IF(ITV1.GE.260) CVANO5 = CVANO5+1
0132      IF(ITV1.GE.331) CVANO1 = CVANO1+1
0133      100 CONTINUE
0134      WRITE(3,200)
0135      200 FORMAT(/75X,'CTT05',5X,'CWIN05',5X,'CTERO5',5X,'CVANO5')
0136      WRITE(3,300)CTT05,CWIN05,CTERO5,CVANO5
0137      300 FORMAT(3X,F6.1,4X,F6.1,5X,F6.1,5X,F6.1)
0138      WRITE(3,400)
0139      400 FORMAT(/75X,'CTT01',5X,'CWIN01',5X,'CTERO1',5X,'CVANO1')
0140      WRITE(3,500)CTT01,CWIN01,CTERO1,CVANO1
0141      500 FORMAT(52X,F6.1,4X,F6.1,5X,F6.1,5X,F6.1)
0142      2000 CONTINUE
0143      STOP
0144      END

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ศูนย์วิทยทรัพยากร
จุฬาลงกรณ์มหาวิทยาลัย

DCS FCPTRAM IV 360H-FO-479 3-B

MAINPOM

DATE 12/03/83

TIME 02.04.13

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C/-----RANDOM-----/
00C1  SUBROUTINE RANDOM(IX,IY,RN)
00C2  COMMON IA
00C3  IY = IX*65539
00C4  IF(IY)5,6,6
00C5  5 IY = IY+2147483647+1
00C6  6 RN = IY
00C7  RN = RN*.4656613E-9
00C8  IX = IY
00C9  IA = IX
0010  RETURN
0011  END

```

RANDOM ()



ศูนย์วิทยทรัพยากร
จุฬาลงกรณ์มหาวิทยาลัย

COS FORTRAN IV 350N-F0-179-2-8 MAINPGM DATE 12/03/83 TIME 02.04.58

```

C/-----NORMAL-----/
C001      SUBROUTINE NORMAL(EX,STD,X,Y)
C002      COMMON IA
C003      1 CALL RANDOM(IA,IY,RN)
C004      V1 = 2.*RN-1.
C005      CALL RANDOM(IA,IY,RN)
C006      V2 = 2.*RN-1.
C007      S = V1*V1+V2*V2
C008      IF(S.GE.1)GO TO 1
C009      RNN1 = V1*SQRT((-2.*ALOG(S))/S)
C010      RNN2 = V2*SQRT((-2.*ALOG(S))/S)
C011      X = EX+RNN1*STD
C012      Y = EX+RNN2*STD
C013      RETURN
C014      END

```



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จุฬาลงกรณ์มหาวิทยาลัย

CGS FORTRAN IV 360N-FO-479 3-8

MAINPGM

DATE 12/03/83

TIME 02.05.36

```

C/-----RANK-----/
0001  SUBROUTINE RANK(A,R,N)
0002  DIMENSION A(10),R(10)
0003  DO 10 I = 1,N
0004    R(I) = 0.0
0005    DO 100 I = 1,N
0006      IF(R(I))20,20,100
0007    20 SMALL = 0.0
0008      EQUAL = 0.0
0009      X = A(I)
0010      DO 50 J = 1,N
0011        IF(A(J)-X)30,40,50
0012    30 SMALL = SMALL+1.0
0013      GO TO 50
0014    40 EQUAL = EQUAL+1.0
0015      R(J) = -1.0
0016    50 CONTINUE
0017      IF(EQUAL-1.0)60,60,70
0018    60 R(I) = SMALL+1.0
0019      GO TO 100
0020    70 P = SMALL+(EQUAL+1.0)*0.5
0021      DO 90 J = 1,N
0022        IF(R(J)+1.0)90,80,90
0023    80 R(J) = P
0024    90 CONTINUE
0025  100 CONTINUE
0026  RETURN
0027  END

```

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จุฬาลงกรณ์มหาวิทยาลัย

COS FORTRAN IV 360N-FU-479 3-8 MAINPGM DATE 17/03/83 TIME 02.09.51

```

C *****
C *
C *
C *          NN : SAMPLE SIZE(N1) = 10
C *
C *
C *****
0001  DIMENSION NGDAT(20),RR(20),R(20),FV(20),Z1(20),IFV(20),
      *I21(20)
0002  COMMON IA
0003  REAL NODAT,N1,N2,MEAN1,MEAN2
0004  N1 = 10
0005  N2 = 10
C/-----/
0006  DO 2000KKK = 1,8
0007  IA = 65539
0008  CTT05 = 0.
0009  CTT01 = 0.
0010  CWIN05 = 0.
0011  CWIN01 = 0.
0012  CTER05 = 0.
0013  CTER01 = 0.
0014  CVAN05 = 0.
0015  CVAN01 = 0.
C/-----/
0016  DO 1001 = 1,1000
0017  STD = 10.
0018  SUM1 = 0.
0019  SUM2 = 0.
0020  SUMX1 = 0.
0021  SUMX2 = 0.
0022  SUMR1 = 0.
0023  SUMR2 = 0.
0024  EXPP = 0.
0025  Z11 = 0.
0026  ISUMT1 = 0.
0027  ISUMT2 = 0.
0028  ISUMV1 = 0.
0029  ISUMV2 = 0.
0030  GO TO (19,12,13,14,15,16,17,18),KKK
C      THIS IS DESIGNED TO COMPUTE THE ACTUAL TYPE I ERROR
C      WHEN DELTA IS 0.05.0.
0031  19 EX = 500.
0032  GO TO 20
C      THIS IS DESIGNED TO COMPUTE THE POWER OF TESTS
C      WHEN DELTA IS 0.255.0.
0033  12 EX = 502.5
0034  GO TO 20
C      THIS IS DESIGNED TO COMPUTE THE POWER OF TESTS
C      WHEN DELTA IS 0.55.0.
0035  13 EX = 505.0
0036  GO TO 20
C      THIS IS DESIGNED TO COMPUTE THE POWER OF TESTS
C      WHEN DELTA IS 0.755.0.
0037  14 EX = 507.5
0038  GO TO 20
C      THIS IS DESIGNED TO COMPUTE THE POWER OF TESTS
C      WHEN DELTA IS 1.05.0.
0039  15 EX = 510.0
0040  GO TO 20
C      THIS IS DESIGNED TO COMPUTE THE POWER OF TESTS
C      WHEN DELTA IS 1.255.0.
0041  16 EX = 512.5
0042  GO TO 20
C      THIS IS DESIGNED TO COMPUTE THE POWER OF TESTS
C      WHEN DELTA IS 1.505.0.
0043  17 EX = 515.0
0044  GO TO 20
C      THIS IS DESIGNED TO COMPUTE THE POWER OF TESTS
C      WHEN DELTA IS 1.755.0.
0045  18 EX = 517.5
0046  20 DO 10J = 1,5
0047  CALL NORMAL(EX,STD,X,Y)

```



```

0048          NODAT(J) = X
0049      10  HODAT(J+5) = Y
0050          EX = 500.
0051          DJ 11IX = 11,15
0052          CALL NCRML(FX,STD,X,Y)
0053          NODAT(IX) = X
0054      11  HODAT(IX+5) = Y
C/-----T-TEST-----
0055          DO 11Q = 1,10
0056      1  SUM1 = SUM1+NODAT(1Q)
0057          MEAN1 = SUM1/N1
0058          DO 8JQ = 1,10
0059      8  SUM2 = SUM2+(NODAT(1Q)-MEAN1)**2
0060          DO 21B = 11,20
0061      2  SUMX1 = SUMX1+NODAT(1B)
0062          MEAN2 = SUMX1/N2
0063          DO 9KQ = 11,20
0064      9  SUMX2 = SUMX2+(NODAT(KQ)-MEAN2)**2
0065          XX = (SUM2+SUMX2)/(N1+N2-2.)*(1./N1+1./N2)
0066          TEST = (MEAN1-MEAN2)/SQRT(XX)
0067          TTEST = ABS(TEST)
0068          IF(TTEST.GE.2.101) CTT05 = CTT05+1
0069          IF(TTEST.GE.2.870) CTT01 = CTT01+1
C/-----WILCOXON-----
0070          N = 20
0071          CALL RANK(NODAT,R,N)
0072          DO 3K = 1,20
0073      3  RK(K) = R(K)
0074          DO 4L = 1,10
0075      4  SUMR1 = SUMR1+RR(L)
0076          DO 5M = 11,20
0077      5  SUMR2 = SUMR2+RR(M)
0078          IF(SUMR1.LT.SUMR2) GO TO 6
0079          TR1 = SUMR2
0080          GO TO 7
0081      6  TR1 = SUMR1
0082      7  WIN = (TR1-N1*(N1+N2+1.)/2.)/SQRT(N1*N2*(N1+N2+1.)/12.)
0083          ZWIN = ABS(WIN)
0084          IF(ZWIN.GE.1.96) CHIN05 = CHIN05+1
0085          IF(ZWIN.GE.2.58) CHIN01 = CHIN01+1
C/-----TERRY-HOFFDING-----
0086          DO 301J = 1,20
0087          IF(RR(1J).EQ.1.) IEV(1J) = -137
0088          IF(RR(1J).EQ.2.) IEV(1J) = -141
0089          IF(RR(1J).EQ.3.) IEV(1J) = -113
0090          IF(RR(1J).EQ.4.) IEV(1J) = -92
0091          IF(RR(1J).EQ.5.) IEV(1J) = -75
0092          IF(RR(1J).EQ.6.) IEV(1J) = -59
0093          IF(RR(1J).EQ.7.) IEV(1J) = -45
0094          IF(RR(1J).EQ.8.) IEV(1J) = -31
0095          IF(RR(1J).EQ.9.) IEV(1J) = -19
0096          IF(RR(1J).EQ.10.)IEV(1J) = -6
0097          IF(RR(1J).EQ.11.)IEV(1J) = 6
0098          IF(RR(1J).EQ.12.)IEV(1J) = 19
0099          IF(RR(1J).EQ.13.)IEV(1J) = 31
0100          IF(RR(1J).EQ.14.)IEV(1J) = 45
0101          IF(RR(1J).EQ.15.)IEV(1J) = 59
0102          IF(RR(1J).EQ.16.)IEV(1J) = 75
0103          IF(RR(1J).EQ.17.)IEV(1J) = 92
0104          IF(RR(1J).EQ.18.)IEV(1J) = 113
0105          IF(RR(1J).EQ.19.)IEV(1J) = 141
0106          IF(RR(1J).EQ.20.)IEV(1J) = 187
0107      30  CONTINUE
0108          DO 31IK = 1,10
0109      31  ISUMT1 = ISUMT1+IEV(1K)
0110          DO 32IN = 11,20
0111      32  ISUMT2 = ISUMT2+IEV(1N)
0112          IF(ISUMT1.LT.ISUMT2) GO TO 33
0113          IT1 = ISUMT2
0114          GO TO 34
0115      33  IT1 = ISUMT1
0116      34  T1 = IT1/100.
0117          DO 35KK = 1,20
0118          EV(KK) = IEV(KK)/100.
0119      35  EXPP = EXPP+EV(KK)**2
0120          VART = N1*N2/(N1+N2-1.)*(EXPP/(N1+N2))

```

```

0121          TER = 11/SQRT(VART)
0122          ZTER = ABS(TER)
0123          IF(ZTER.GE.1.96) CTER05 = CTER05+1
0124          IF(ZTER.GE.2.58) CTER01 = CTER01+1
C/-----VAN DER WAERDEN-----
0125          DO 50JJ = 1,20
0126          IF(RR(JJ).EQ.1.) IZI(JJ) = -167
0127          IF(RR(JJ).EQ.2.) IZI(JJ) = -131
0128          IF(RR(JJ).EQ.3.) IZI(JJ) = -107
0129          IF(RR(JJ).EQ.4.) IZI(JJ) = -83
0130          IF(RR(JJ).EQ.5.) IZI(JJ) = -71
0131          IF(RR(JJ).EQ.6.) IZI(JJ) = -57
0132          IF(RR(JJ).EQ.7.) IZI(JJ) = -44
0133          IF(RR(JJ).EQ.8.) IZI(JJ) = -30
0134          IF(RR(JJ).EQ.9.) IZI(JJ) = -18
0135          IF(RR(JJ).EQ.10.) IZI(JJ) = -6
0136          IF(RR(JJ).EQ.11.) IZI(JJ) = 6
0137          IF(RR(JJ).EQ.12.) IZI(JJ) = 18
0138          IF(RR(JJ).EQ.13.) IZI(JJ) = 30
0139          IF(RR(JJ).EQ.14.) IZI(JJ) = 43
0140          IF(RR(JJ).EQ.15.) IZI(JJ) = 57
0141          IF(RR(JJ).EQ.16.) IZI(JJ) = 71
0142          IF(RR(JJ).EQ.17.) IZI(JJ) = 88
0143          IF(RR(JJ).EQ.18.) IZI(JJ) = 107
0144          IF(RR(JJ).EQ.19.) IZI(JJ) = 131
0145          IF(RR(JJ).EQ.20.) IZI(JJ) = 157
0146          50 CONTINUE
0147          DO 51LL = 1,10
0148          51 ISUMV1 = ISUMV1+IZI(LL)
0149          DO 52MM = 11,20
0150          52 ISUMV2 = ISUMV2+IZI(MM)
0151          IF(ISUMV1.LT.ISUMV2) GO TO 53
0152          ITV1 = ISUMV2
0153          GO TO 54
0154          53 ITV1 = ISUMV1
0155          54 TV1 = ITV1/100.
0156          DO 55NN = 1,20
0157          ZI(NN) = IZI(NN)/100.
0158          55 ZII = ZII+ZI(NN)**2/(N1+N2)
0159          VARV = N1*N2/(N1+N2-1)*ZII
0160          VAN = TV1/SQRT(VARV)
0161          ZVAN = ABS(VAN)
0162          IF(ZVAN.GE.1.96) CVAN05 = CVAN05+1
0163          IF(ZVAN.GE.2.58) CVAN01 = CVAN01+1
0164          100 CONTINUE
0165          WRITE(3,200)
0166          200 FORMAT(//5X,'CTT05',5X,'CHIN05',5X,'CTER05',5X,'CVAN05')
0167          WRITE(3,300)CTT05,CHIN05,CTER05,CVAN05
0168          300 FORMAT(3X,F6.1,4X,F6.1,5X,F6.1,5X,F6.1)
0169          WRITE(3,400)
0170          400 FORMAT(//55X,'CTT01',5X,'CHIN01',5X,'CTER01',5X,'CVAN01')
0171          WRITE(3,500)CTT01,CHIN01,CTER01,CVAN01
0172          500 FORMAT(53X,F6.1,4X,F6.1,5X,F6.1,5X,F6.1)
0173          2000 CONTINUE
0174          STOP
0175          END

```

จุฬาลงกรณ์มหาวิทยาลัย

DCS FCPTAN IV 369N-FO-479 3-8 MAINPGM DATE 12/03/83 TIME 02.04.13

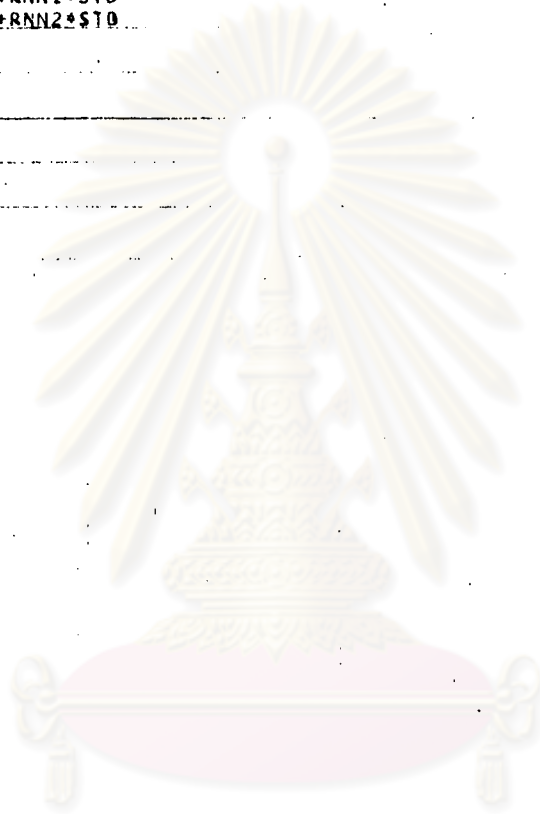
```
C/-----RANDOM-----/
00C1      SUBROUTINE RANDOM(IX,IY,RN)
00C2      COMMON IA
00C3      IY = IX*65539
00C4      IF(IY)5,6,6
00C5      5 IY = IY+2147483647+1
00C6      6 RN = .IY
00C7      RN = RN*.4656613E-9
00C8      IX = IY
00C9      IA = IX
0010      RETURN
0011      END
```



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จุฬาลงกรณ์มหาวิทยาลัย

EQS FORTRAN IV 360N-EQ-379 1-8 MAINPGM: DATE 12/03/83 TIME 02.04.58

```
C/-----NORMAL-----/
C001      SUBROUTINE NORMAL(EX,STD,X,Y)
C002      COMMON IA
C003      1 CALL RANDOM(IA,IY,RN)
C004      V1 = 2.*RN-1.
C005      CALL RANDOM(IA,IY,RN)
C006      V2 = 2.*RN-1.
C007      S = V1*V1+V2*V2
C008      IF(S.GE.1)GO TO 1
C009      RNN1 = V1*SQRT((-2.* ALOG(S))/S)
C010      RNN2 = V2*SQRT((-2.* ALOG(S))/S)
C011      X = EX+RNN1*STD
C012      Y = EX+RNN2*STD
C013      RETURN
C014      END
```



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จุฬาลงกรณ์มหาวิทยาลัย

DGS FORTRAN IV 360N-FO-472 3-8

MAINPGM

DATE 12/02/82

TIME 02.10.4

```

C/-----RANK-----
0001      SUBROUTINE RANK(A,R,N)
0002      DIMENSION A(20),R(20)
0003      DO 10 I = 1,N
0004      10 R(I) = 0.0
0005      DO 100 I = 1,N
0006      IF(R(I))120,20,100
0007      20 SMALL = 0.0
0008      EQUAL = 0.0
0009      X = A(I)
0010      DO 50 J = 1,N
0011      IF(A(J)-X)30,40,50
0012      30 SMALL = SMALL+1.0
0013      GO TO 50
0014      40 EQUAL = EQUAL+1.0
0015      R(J) = -1.0
0016      50 CONTINUE
0017      IF(EQUAL-1.0)60,60,70
0018      60 R(I) = SMALL+1.0
0019      GO TO 100
0020      70 P = SMALL+(EQUAL+1.0)*0.5
0021      DO 90 J = 1,N
0022      IF(R(J)+1.0)90,80,90
0023      80 R(J) = P
0024      90 CONTINUE
0025      100 CONTINUE
0026      RETURN
0027      END

```

ศูนย์วิทยทรัพยากร
จุฬาลงกรณ์มหาวิทยาลัย

```

C *****
C *
C *
C *          NN : SAMPLE SIZE(N1) = 16
C *
C *
C *****
0001      DIMENSION NODAT(30),RR(30),R(30),EV(30),Z1(30),IEV(30),
          *I2I(30)
0002      COMMON IA
0003      REAL NODAT,N1,N2,MEAN1,MEAN2
0004      N1 = 15
0005      N2 = 15
0006      Y = 0.
C/-----
0007      DC 2000KKK = 1,8
0008      IA = 55539
0009      CIT05 = 0.
0010      CIT01 = 0.
0011      CWIN05 = 0.
0012      CWIN01 = 0.
0013      CTER05 = 0.
0014      CTER01 = 0.
0015      CVANC5 = 0.
0016      CVAN01 = 0.
C/-----
0017      DC 1001 = 1,1000
0018      STD = 10.
0019      SUM1 = 0.
0020      SUM2 = 0.
0021      SUMX1 = 0.
0022      SUMX2 = 0.
0023      SUMR1 = 0.
0024      SUMR2 = 0.
0025      EXPP = 0.
0026      Z11 = 0.
0027      ISUMT1 = 0.
0028      ISUMT2 = 0.
0029      ISUMV1 = 0.
0030      ISUMV2 = 0.
0031      GO TO (19,12,13,14,15,16,17,18),KKK
C      THIS IS DESIGNED TO COMPUTE THE ACTUAL TYPE I ERROR
C      WHEN DELTA IS 0.05.D.
0032      19 EX = 500.
0033      GO TO 20
C      THIS IS DESIGNED TO COMPUTE THE POWER OF TESTS
C      WHEN DELTA IS 0.25S.D.
0034      12 EX = 502.5
0035      GO TO 20
C      THIS IS DESIGNED TO COMPUTE THE POWER OF TESTS
C      WHEN DELTA IS 0.5S.D.
0036      13 EX = 505.0
0037      GO TO 20
C      THIS IS DESIGNED TO COMPUTE THE POWER OF TESTS
C      WHEN DELTA IS 0.75S.D.
0038      14 EX = 507.5
0039      GO TO 20
C      THIS IS DESIGNED TO COMPUTE THE POWER OF TESTS
C      WHEN DELTA IS 1.0S.D.
0040      15 EX = 510.0
0041      GO TO 20
C      THIS IS DESIGNED TO COMPUTE THE POWER OF TESTS
C      WHEN DELTA IS 1.25S.D.
0042      16 EX = 512.5
0043      GO TO 20
C      THIS IS DESIGNED TO COMPUTE THE POWER OF TESTS
C      WHEN DELTA IS 1.50S.D.
0044      17 EX = 515.0
0045      GO TO 20
C      THIS IS DESIGNED TO COMPUTE THE POWER OF TESTS
C      WHEN DELTA IS 1.75S.D.
0046      18 EX = 517.5
0047      20 DD 10J = 1,15
0048      IF(Y.NE.0.)GO TO 21

```

```

0049          CALL NORMAL(EX,STD,X,Y)
0050          GO TO 10
0051      21 X = Y
0052          Y = 0.
0053      10 NODAT(J) = X
0054          EX = 500.
0055          DC 111X = 16,30
0056          IF(Y.NE.0.)GO TO 22
0057          CALL NORMAL(EX,STD,X,Y)
0058          GO TO 11
0059      22 X = Y
0060          Y = 0.
0061      11 NODAT(I)X) = X
C/-----T-TEST-----
0062          DO 110 = 1,15
0063      1 SUM1 = SUM1+NODAT(110)
0064          MEAN1 = SUM1/N1
0065          DO 810 = 1,15
0066      8 SUM2 = SUM2+(NODAT(110)-MEAN1)**2
0067          DC 218 = 16,30
0068      2 SUMX1 = SUMX1+NODAT(110)
0069          MEAN2 = SUMX1/N2
0070          DO 910 = 1,30
0071      9 SUMX2 = SUMX2+(NODAT(K0)-MEAN2)**2
0072          XX = (SUM2+SUMX2)/(N1+N2-2.)*(1./N1)+1./N2)
0073          TEST = (MEAN1-MEAN2)/SQRT(XX)
0074          TTEST = ABS(TEST)
0075          IF(TTEST.GE.2.048) CTT05 = CTT05+1
0076          IF(TTEST.GE.2.763) CTT01 = CTT01+1
C/-----WILCOXON-----
0077          N = 30
0078          CALL RANK(NODAT,R,N)
0079          DO 310 = 1,30
0080      3 RR(K) = R(K)
0081          DO 410 = 1,15
0082      4 SUMR1 = SUMR1+RR(L)
0083          DO 510 = 16,30
0084      5 SUMR2 = SUMR2+RR(M)
0085          IF(SUMR1.LT.SUMR2) GO TO 6
0086          TR1 = SUMR2
0087          GO TO 7
0088      6 TR1 = SUMR1
0089      7 WIN = (TR1-N1*(N1+N2+1.)/2.)/SQRT(N1*N2*(N1+N2+1.)/12.)
0090          ZWIN = ABS(WIN)
0091          IF(ZWIN.GE.1.96) CWIN05 = CWIN05+1
0092          IF(ZWIN.GE.2.58) CWIN01 = CWIN01+1
C/-----TEPRY-HOFFRING-----
0093          DO 301J = 1,30
0094          IF(RR(1J).EQ.1.) IEV(1J) = -204
0095          IF(RR(1J).EQ.2.) IEV(1J) = -162
0096          IF(RR(1J).EQ.3.) IEV(1J) = -136
0097          IF(RR(1J).EQ.4.) IEV(1J) = -118
0098          IF(RR(1J).EQ.5.) IEV(1J) = -103
0099          IF(RR(1J).EQ.6.) IEV(1J) = -89
0100          IF(RR(1J).EQ.7.) IEV(1J) = -78
0101          IF(RR(1J).EQ.8.) IEV(1J) = -67
0102          IF(RR(1J).EQ.9.) IEV(1J) = -57
0103          IF(RR(1J).EQ.10.)IEV(1J) = -47
0104          IF(RR(1J).EQ.11.)IEV(1J) = -39
0105          IF(RR(1J).EQ.12.)IEV(1J) = -29
0106          IF(RR(1J).EQ.13.)IEV(1J) = -21
0107          IF(RR(1J).EQ.14.)IEV(1J) = -12
0108          IF(RR(1J).EQ.15.)IEV(1J) = -4
0109          IF(RR(1J).EQ.16.)IEV(1J) = 4
0110          IF(RR(1J).EQ.17.)IEV(1J) = 12
0111          IF(RR(1J).EQ.18.)IEV(1J) = 21
0112          IF(RR(1J).EQ.19.)IEV(1J) = 29
0113          IF(RR(1J).EQ.20.)IEV(1J) = 39
0114          IF(RR(1J).EQ.21.)IEV(1J) = 47
0115          IF(RR(1J).EQ.22.)IEV(1J) = 57
0116          IF(RR(1J).EQ.23.)IEV(1J) = 67
0117          IF(RR(1J).EQ.24.)IEV(1J) = 78
0118          IF(RR(1J).EQ.25.)IEV(1J) = 89
0119          IF(RR(1J).EQ.26.)IEV(1J) = 103
0120          IF(RR(1J).EQ.27.)IEV(1J) = 118
0121          IF(RR(1J).EQ.28.)IEV(1J) = 136
0122          IF(RR(1J).EQ.29.)IEV(1J) = 162
0123          IF(RR(1J).EQ.30.)IEV(1J) = 204
0124          30 CONTINUE

```

```

0125          DC 31IK = 1,15
0126          31 ISUMT1 = ISUMT1+IEV(IK)
0127          DO 32IN = 16,30
0128          32 ISUMT2 = ISUMT2+IEV(IN)
0129          IF(ISUMT1.LT.ISUMT2) GO TO 33
0130          IT1 = ISUMT2
0131          GO TO 34
0132          33 IT1 = ISUMT1
0133          34 IT1 = IT1/100.
0134          DC 35KK = 1,30
0135          EV(KK) = IEV(KK)/100.
0136          35 EXPP = EXPP+EV(KK)*2
0137          VART = N1*N2/(N1+N2-1.)*(EXPP/(N1+N2))
0138          IER = IT1/SQRT(VART)
0139          ZTER = ABS(IEV)
0140          IF(ZTER.GE.1.96) CTER05 = CTER05+1
0141          IF(ZTER.GE.2.58) CTER01 = CTER01+1
-----
C/-----VAN DER WAERDEN-----
0142          DO 50JJ = 1,30
0143          IF(RR(JJ).EQ.1.) IZ1(JJ) = -185
0144          IF(RR(JJ).EQ.2.) IZ1(JJ) = -152
0145          IF(RR(JJ).EQ.3.) IZ1(JJ) = -130
0146          IF(RR(JJ).EQ.4.) IZ1(JJ) = -113
0147          IF(RR(JJ).EQ.5.) IZ1(JJ) = -99
0148          IF(RR(JJ).EQ.6.) IZ1(JJ) = -86
0149          IF(RR(JJ).EQ.7.) IZ1(JJ) = -75
0150          IF(RR(JJ).EQ.8.) IZ1(JJ) = -65
0151          IF(RR(JJ).EQ.9.) IZ1(JJ) = -55
0152          IF(RR(JJ).EQ.10.) IZ1(JJ) = -46
0153          IF(RR(JJ).EQ.11.) IZ1(JJ) = -37
0154          IF(RR(JJ).EQ.12.) IZ1(JJ) = -29
0155          IF(RR(JJ).EQ.13.) IZ1(JJ) = -20
0156          IF(RR(JJ).EQ.14.) IZ1(JJ) = -12
0157          IF(RR(JJ).EQ.15.) IZ1(JJ) = -4
0158          IF(RR(JJ).EQ.16.) IZ1(JJ) = 4
0159          IF(RR(JJ).EQ.17.) IZ1(JJ) = 12
0160          IF(RR(JJ).EQ.18.) IZ1(JJ) = 20
0161          IF(RR(JJ).EQ.19.) IZ1(JJ) = 29
0162          IF(RR(JJ).EQ.20.) IZ1(JJ) = 37
0163          IF(RR(JJ).EQ.21.) IZ1(JJ) = 46
0164          IF(RR(JJ).EQ.22.) IZ1(JJ) = 55
0165          IF(RR(JJ).EQ.23.) IZ1(JJ) = 65
0166          IF(RR(JJ).EQ.24.) IZ1(JJ) = 75
0167          IF(RR(JJ).EQ.25.) IZ1(JJ) = 86
0168          IF(RR(JJ).EQ.26.) IZ1(JJ) = 99
0169          IF(RR(JJ).EQ.27.) IZ1(JJ) = 113
0170          IF(RR(JJ).EQ.28.) IZ1(JJ) = 130
0171          IF(RR(JJ).EQ.29.) IZ1(JJ) = 152
0172          IF(RR(JJ).EQ.30.) IZ1(JJ) = 185
0173          50 CONTINUE
0174          DO 51LL = 1,15
0175          51 ISUMV1 = ISUMV1+IZ1(LL)
0176          DO 52MM = 16,30
0177          52 ISUMV2 = ISUMV2+IZ1(MM)
0178          IF(ISUMV1.LT.ISUMV2) GO TO 53
0179          ITV1 = ISUMV2
0180          GO TO 54
0181          53 ITV1 = ISUMV1
0182          54 TV1 = ITV1/100.
0183          DO 55NN = 1,30
0184          ZI(NN) = IZ1(NN)/100.
0185          55 ZII = ZII+ZI(NN)**2/(N1+N2)
0186          VARV = N1*N2/(N1+N2-1.)*ZII
0187          VAN = TV1/SQRT(VARV)
0188          ZVAN = ABS(VAN)
0189          IF(ZVAN.GE.1.96) CVAN05 = CVAN05+1
0190          IF(ZVAN.GE.2.58) CVAN01 = CVAN01+1
0191          100 CONTINUE
0192          WRITE(3,200)
0193          200 FORMAT(//5X,'CTT05',5X,'CWIN05',5X,'CTER05',5X,'CVAN05')
0194          WRITE(3,300)CTT05,CWIN05,CTER05,CVAN05
0195          300 FORMAT(3X,F6.1,4X,F6.1,5X,F6.1,5X,F6.1)
0196          WRITE(3,400)
0197          400 FORMAT(//55X,'CTT01',5X,'CWIN01',5X,'CTER01',5X,'CVAN01')
0198          WRITE(3,500)CTT01,CWIN01,CTER01,CVAN01
0199          500 FORMAT(53X,F6.1,4X,F6.1,5X,F6.1,5X,F6.1)
0200          CONTINUE
0201          STOP
0202          END

```


DCS FORTRAN IV 360N-FO-479 3-8

MAINPGM

DATE 12/03/83

TIME 02.04.13

```
C/-----RANDOM-----/
0001  SUBROUTINE RANDCM(IX,IY,RN)
0002  COMMON IA
0003  IY = IX+65539
0004  IF(IY)5,6,6
0005  5 IY = IY+2147483647+1
0006  6 RN = IY
0007  RN = RN*.4656613E-9
0009  IX = IY
0009  IA = IX
0010  RETURN
0011  END
```



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DOS FORTRAN IV. 362N-EO-179.3-8 MAINPGM DATE 17/03/83 TIME 02.04.59

```

C/-----NORMAL-----/
0001      SUBROUTINE NORMAL(EX,STD,X,Y)
0002      COMMON IA
0003      1 CALL RANDOM(IA,IY,RN)
0004      V1 = 2.*RN-1.
0005      CALL RANDOM(IA,IY,RN)
0006      V2 = 2.*RN-1.
0007      S = V1*V1+V2*V2
0008      IF(S.GE.1)GO TO 1
0009      RNN1 = V1*SQRT((-2.* ALOG(S))/S)
0010      RNN2 = V2*SQRT((-2.* ALOG(S))/S)
0011      X = EX+RNN1*STD
0012      Y = EX+RNN2*STD
0013      RETURN
0014      END

```



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DCS FORTRAN IV. 362N-FD-479 3-9

MAINPGM

DATE 12/03/83

TIME 02.17.1

```

C/-----RANK-----
0001      SUBROUTINE RANK(A,R,N)
0002      DIMENSION A(301,R(30)
0003      DO 10 I = 1,N
0004      10 R(I) = 0.0
0005      DO 100 I = 1,N
0006      IF(R(I))20,20,100
0007      20 SMALL = 0.0
0008      EQUAL = 0.0
0009      X = A(I)
0010      DO 50 J = 1,N
0011      IF(A(J)-X)30,40,50
0012      30 SMALL = SMALL+1.0
0013      GO TO 50
0014      40 EQUAL = EQUAL+1.0
0015      R(J) = -1.0
0016      50 CONTINUE
0017      IF(EQUAL-1.0)60,60,70
0018      60 R(I) = SMALL+1.0
0019      GO TO 100
0020      70 P = SMALL+(EQUAL+1.0)*0.5
0021      DO 90 J = 1,N
0022      IF(R(J)+1.0)90,80,90
0023      80 R(J) = P
0024      90 CONTINUE
0025      100 CONTINUE
0026      RETURN
0027      END

```

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DOS FORTRAN IV 360N FD-479 3 8

MAINPGM

DATE 15/03/83

TIME 22.53.26

```

C *****
C *
C *
C *          UU : SAMPLE SIZE(N1) = 5
C *
C *
C *****
0001      DIMENSION NODAT(10),PP(10),R(10),EV(10),Z1(10),IFV(10),
          *IZI(10)
0002      COMMON IA
0003      REAL NODAT,N1,N2,MEAN1,MEAN2
0004      N1 = 5
0005      N2 = 5
C/-----
0006      DO 2000KKK = 1,8
0007      IA = 65539
0008      CTT05 = 0.
0009      CTT01 = 0.
0010      CWIN05 = 0.
0011      CWIN01 = 0.
0012      CTER05 = 0.
0013      CTER01 = 0.
0014      CVAN05 = 0.
0015      CVAN01 = 0.
C/-----
0016      DO 1001 = 1,1000
0017      STD = 10.
0018      SUM1 = 1.
0019      SUM2 = 0.
0020      SUMX1 = 0.
0021      SUMX2 = 0.
0022      SUMR1 = 0.
0023      SUMR2 = 0.
0024      ISUMT1 = 0
0025      ISUMT2 = 0
0026      ISUMV1 = 0
0027      ISUMV2 = 0
0028      GO TO (19,12,13,14,15,16,17,18),KKK
C          THIS IS DESIGNED TO COMPUTE THE ACTUAL TYPE I ERROR
C          WHEN DELTA IS 0.05.D.
0029      19 EX = 500.
0030      GO TO 20
C          THIS IS DESIGNED TO COMPUTE THE POWER OF TESTS
C          WHEN DELTA IS 0.25S.D.
0031      12 EX = 502.5
0032      GO TO 20
C          THIS IS DESIGNED TO COMPUTE THE POWER OF TESTS
C          WHEN DELTA IS 0.5S.D.
0033      13 EX = 505.0
0034      GO TO 20
C          THIS IS DESIGNED TO COMPUTE THE POWER OF TESTS
C          WHEN DELTA IS 0.75S.D.
0035      14 EX = 507.5
0036      GO TO 20
C          THIS IS DESIGNED TO COMPUTE THE POWER OF TESTS
C          WHEN DELTA IS 1.0S.D.
0037      15 EX = 510.0
0038      GO TO 20
C          THIS IS DESIGNED TO COMPUTE THE POWER OF TESTS
C          WHEN DELTA IS 1.25S.D.
0039      16 EX = 512.5
0040      GO TO 20
C          THIS IS DESIGNED TO COMPUTE THE POWER OF TESTS
C          WHEN DELTA IS 1.50S.D.
0041      17 EX = 515.0
0042      GO TO 20
C          THIS IS DESIGNED TO COMPUTE THE POWER OF TESTS
C          WHEN DELTA IS 1.75S.D.
0043      18 EX = 517.5
0044      20 B = EX+(STD*SQRT(3.))
0045      A = (2.*EX)-B
0046      DO 10J = 1,5
0047      CALL UNIFX(A,B,Z)
0048      10 NODAT(J) = Z
0049      EX = 500.

```

```

0050      B = EX+(STD*SQRT(3.))
0051      A = (2.*EX)-B
0052      DO 11IX = 6,10
0053      CALL UNIFM(A,B,Z)
0054      11 NODAT(IX) = Z

C/      T TEST
0055      DO 1IQ = 1,5
0056      1 SUM1 = SUM1+NODAT(IQ)
0057      MEAN1 = SUM1/N1
0058      DO 8JQ = 1,5
0059      8 SUM2 = SUM2+(NODAT(JQ)-MEAN1)**2
0060      DO 2IB = 6,10
0061      2 SUMX1 = SUMX1+NODAT(1B)
0062      MEAN2 = SUMX1/N2
0063      DO 9KQ = 6,10
0064      9 SUMX2 = SUMX2+(NODAT(KQ)-MEAN2)**2
0065      XX = (SUM2+SUMX2)/(N1+N2-2.)*(1./N1+1./N2)
0066      TEST = (MEAN1-MEAN2)/SQRT(XX)
0067      TTEST = ABS(TEST)
0068      IF(TTEST.GE.2.306) CTT05 = CTT05+1
0069      IF(TTEST.GE.3.355) CTT01 = CTT01+1

```

```

C/----- WILCOXON
0070      N = 10
0071      CALL RANK(NODAT,R,N)
0072      DO 3K = 1,10
0073      3 RR(K) = R(K)
0074      DO 4L = 1,5
0075      4 SUMR1 = SUMR1+RR(L)
0076      DO 5M = 6,10
0077      5 SUMR2 = SUMR2+RR(M)
0078      IF(SUMR1.LT.SUMR2) GO TO 6
0079      TR1 = SUMR2
0080      GO TO 7
0081      6 TR1 = SUMR1
0082      7 IF(TR1.LE.18.0) CWIN05 = CWIN05+1
0083      IF(TR1.LE.15.0) CWIN01 = CWIN01+1

```

```

C/----- TERRY-HOEFFDING
0084      DO 30IJ = 1,10
0085      IF(RR(IJ).EQ.1.) IEV(IJ) = -154
0086      IF(RR(IJ).EQ.2.) IEV(IJ) = -100
0087      IF(RR(IJ).EQ.3.) IEV(IJ) = -66
0088      IF(RR(IJ).EQ.4.) IEV(IJ) = -33
0089      IF(RR(IJ).EQ.5.) IEV(IJ) = -12
0090      IF(RR(IJ).EQ.6.) IEV(IJ) = 12
0091      IF(RR(IJ).EQ.7.) IEV(IJ) = 38
0092      IF(RR(IJ).EQ.8.) IEV(IJ) = 66
0093      IF(RR(IJ).EQ.9.) IEV(IJ) = 100
0094      IF(RR(IJ).EQ.10.) IEV(IJ) = 154
0095      30 CONTINUE
0096      DO 31IK = 1,5
0097      31 ISUMT1 = ISUMT1+IEV(1K)
0098      DO 32IN = 6,10
0099      32 ISUMT2 = ISUMT2+IEV(IN)
0100      IF(ISUMT1.GT.ISUMT2) GO TO 33
0101      IT1 = ISUMT2
0102      GO TO 34
0103      33 IT1 = ISUMT1
0104      34 IF(IT1.GE.292) CTER05 = CTER05+1
0105      IF(IT1.GE.370) CTER01 = CTER01+1

```

```

C/----- VAN DER WAERDEN
0106      DO 50JJ = 1,10
0107      IF(RR(JJ).EQ.1.) IZI(JJ) = -134
0108      IF(RR(JJ).EQ.2.) IZI(JJ) = 91
0109      IF(RR(JJ).EQ.3.) IZI(JJ) = -60
0110      IF(RR(JJ).EQ.4.) IZI(JJ) = -35
0111      IF(RR(JJ).EQ.5.) IZI(JJ) = 11
0112      IF(RR(JJ).EQ.6.) IZI(JJ) = 11
0113      IF(RR(JJ).EQ.7.) IZI(JJ) = 35
0114      IF(RR(JJ).EQ.8.) IZI(JJ) = 60
0115      IF(RR(JJ).EQ.9.) IZI(JJ) = 91
0116      IF(RR(JJ).EQ.10.) IZI(JJ) = 134
0117      50 CONTINUE
0118      DO 51LL = 1,5
0119      51 ISUMV1 = ISUMV1+IZI(LL)

```

```

0120      DO 52MM = 6,10
0121      52 ISUMV2 = ISUMV2+IZI(MM)
0122      IF(ISUMV1.GT.ISUMV2) GO TO 53
0123      ITV1 = ISUMV2
0124      GO TO 54
0125      53 ITV1 = ISUMV1
0126      54 IF(ITV1.GE.260) CVAN05 = CVAN05+1
0127      IF(ITV1.GE.331) CVAN01 = CVAN01+1
0128      100 CONTINUE
0129      WRITE(3,200)
0130      200 FORMAT(/5X,'CTT05',5X,'CWIN05',5X,'CTER05',5X,'CVAN05')
0131      WRITE(3,300)CTT05,CWIN05,CTER05,CVAN05
0132      300 FORMAT(3X,F6.1,4X,F6.1,5X,F6.1;5X,F6.1)
0133      WRITE(3,400)
0134      400 FORMAT(/55X,'CTT01',5X,'CWIN01',5X,'CTER01',5X,'CVAN01')
0135      WRITE(3,500)CTT01,CWIN01,CTER01,CVAN01
0136      500 FORMAT(53X,F6.1,4X,F6.1,5X,F6.1,5X,F6.1)
0137      2000 CONTINUE
0138      STOP
0139      END

```



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DCS FORTRAN IV 360N-FO-479 3-8

MAINPGM

DATE 12/23/83

TIME 02.04.13

```
C/-----RANDOM-----/
00C1      SUBROUTINE RANDOM(IX,IY,RN)
00C2      COMMON IA
00C3      IY = IX*65539
00C4      IF(IY)5,6,6
00C5      5 IY = IY+2147483647+1
00C6      6 RN = IY
00C7      RN = RN*.4656613E-9
00C8      IX = IY
00C9      IA = IX
00D0      RETURN
00D1      END
```



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DOS FORTRAN IV 360N-FO-479 3-8

MAINPGM

DATE 15/03/83

TIME

22.54.04

0001
0002
0003
0004
0005
0006

C/-----UNIFORM-----/

SUBROUTINE UNIFM(A,B,Z)
COMMON IA
CALL RANDOM(IA,IY,RN)
Z = A+(B-A)*RN
RETURN
END

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COS FORTRAN IV 360N-FD-479 3-8

MAINPGM

DATE 12/03/83

TIME 02.05.36

```

C/-----RANK-----/
0001      SUBROUTINE RANK(A,R,N)
0002      DIMENSION A(101,B(10)
0003      DO 10I = 1,N
0004      10 R(I) = 0.0
0005      DO 100J = 1,N
0006      IF(R(I))20,20,100
0007      20 SMALL = 0.0
0008      EQUAL = 0.0
0009      X = A(I)
0010      DO 50J = 1,N
0011      IF(A(J)-X)30,40,50
0012      30 SMALL = SMALL+1.0
0013      GO TO 50
0014      40 EQUAL = EQUAL+1.0
0015      R(J) = -1.0
0016      50 CONTINUE
0017      IF(EQUAL-1.0)60,60,70
0018      60 R(I) = SMALL+1.0
0019      GO TO 100
0020      70 P = SMALL+(EQUAL+1.0)*0.5
0021      DO 90J = 1,N
0022      IF(R(J)+1.0)90,80,90
0023      80 R(J) = P
0024      90 CONTINUE
0025      100 CONTINUE
0026      RETURN
0027      END

```

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DJS FORTRAN IV 350N-FD-479 3-8

MAINPGM

DATE 15/03/83

TIME 22.59.30

```

C *****
C *
C *
C *          UU : SAMPLE SIZE(N1) = 10
C *
C *
C *****
0001      DIMENSION NODAT(20),RR(20),R(20),EV(20),Z(20),LEV(20),
          *IZI(20)
0002      COMMON IA
0003      REAL NODAT,N1,N2,MEAN1,MEAN2
0004      N1 = 10
0005      N2 = 10
C/---
0006      DD 2J00KKK = 1,8
0007      IA = 65539
0008      CTT05 = 0.
0009      CTT01 = 0.
0010      CWIN05 = 0.
0011      CWIN01 = 0.
0012      CTER05 = 0.
0013      CTER01 = 0.
0014      CVAN05 = 0.
0015      CVAN01 = 0.
C/-----
0016      DD 1001 = 1,1000
0017      STD = 10.
0018      SUM1 = 0.
0019      SUM2 = 0.
0020      SUMX1 = 0.
0021      SUMX2 = 0.
0022      SUMR1 = 0.
0023      SUMR2 = 0.
0024      EXPP = 0.
0025      ZII = 0.
0026      ISUMT1 = 0.
0027      ISUMT2 = 0.
0028      ISUMV1 = 0.
0029      ISUMV2 = 0.
0030      GO TO (19,12,13,14,15,16,17,18),KKK
C      THIS IS DESIGNED TO COMPUTE THE ACTUAL TYPE I ERROR
C      WHEN DELTA IS 0.05.D.
0031      19 EX = 500.
0032      GO TO 20
C      THIS IS DESIGNED TO COMPUTE THE POWER OF TESTS
C      WHEN DELTA IS 0.25S.D.
0033      12 EX = 502.5
0034      GO TO 20
C      THIS IS DESIGNED TO COMPUTE THE POWER OF TESTS
C      WHEN DELTA IS 0.5S.D.
0035      13 EX = 505.0
0036      GO TO 20
C      THIS IS DESIGNED TO COMPUTE THE POWER OF TESTS
C      WHEN DELTA IS 0.75S.D.
0037      14 EX = 507.5
0038      GO TO 20
C      THIS IS DESIGNED TO COMPUTE THE POWER OF TESTS
C      WHEN DELTA IS 1.0S.D.
0039      15 EX = 510.0
0040      GO TO 20
C      THIS IS DESIGNED TO COMPUTE THE POWER OF TESTS
C      WHEN DELTA IS 1.25S.D.
0041      16 EX = 512.5
0042      GO TO 20
C      THIS IS DESIGNED TO COMPUTE THE POWER OF TESTS
C      WHEN DELTA IS 1.50S.D.
0043      17 EX = 515.0
0044      GO TO 20
C      THIS IS DESIGNED TO COMPUTE THE POWER OF TESTS
C      WHEN DELTA IS 1.75S.D.
0045      18 EX = 517.5
0046      20 B = EX+(STD*SQRT(3.))
0047      A = (2.*EX) B
0048      DD 10J = 1,1)

```

```

0049      CALL UNIFM(A,B,Z)
0050      10 NODAT(J) = Z
0051         EX = 500.
0052         B = EX*(STD*SQRT(3.))
0053         A = (2.*EX)-B
0054         DO 11IX = 1,20
0055         CALL UNIFM(A,B,Z)
0056      11 NODAT(IX) = Z
C/----- T TEST -----
0057      DO 11Q = 1,10
0058      1 SUM1 = SUM1+NODAT(IQ)
0059         MEAN1 = SUM1/N1
0060         DO 8JQ = 1,10
0061      8 SUM2 = SUM2+(NODAT(JQ)-MEAN1)**2
0062         DO 21B = 1,20
0063      2 SUMX1 = SUMX1+NODAT(IB)
0064         MEAN2 = SUMX1/N2
0065         DO 9KQ = 1,20
0066      9 SUMX2 = SUMX2+(NODAT(KQ)-MEAN2)**2
0067         XX = (SUM2+SUMX2)/(N1+N2-2.)*(1./N1+1./N2)
0068         TEST = (MEAN1-MEAN2)/SQRT(XX)
0069         TTEST = ABS(TEST)
0070         IF(TTEST.GE.2.101) CTT05 = CTT05+1
0071         IF(TTEST.GE.2.878) CTT01 = CTT01+1
C/----- WILCOXON -----
0072      N = 20
0073      CALL RANK(NODAT,R,N)
0074      DO 3K = 1,20
0075      3 RR(K) = R(K)
0076         DO 4L = 1,10
0077      4 SUMR1 = SUMR1+RR(L)
0078         DO 5M = 1,20
0079      5 SUMR2 = SUMR2+RR(M)
0080         IF(SUMR1.LT.SUMR2) GO TO 6
0081         TR1 = SUMR2
0082         GO TO 7
0083      6 TR1 = SUMR1
0084      7 WIN = (TR1 N1*(N1+N2+1.)/2.)/SQRT(N1*N2*(N1+N2+1.)/12.)
0085         ZWIN = ABS(WIN)
0086         IF(ZWIN.GE.1.96) CWIN05 = CWIN05+1
0087         IF(ZWIN.GE.2.58) CWIN01 = CWIN01+1
C/----- TERRY-HOEFFDING -----
0088      DO 30IJ = 1,20
0089      IF(RR(IJ).EQ.1.) IEV(IJ) = 187
0090      IF(RR(IJ).EQ.2.) IEV(IJ) = -141
0091      IF(RR(IJ).EQ.3.) IEV(IJ) = -113
0092      IF(RR(IJ).EQ.4.) IEV(IJ) = 92
0093      IF(RR(IJ).EQ.5.) IEV(IJ) = -75
0094      IF(RR(IJ).EQ.6.) IEV(IJ) = -59
0095      IF(RR(IJ).EQ.7.) IEV(IJ) = 45
0096      IF(RR(IJ).EQ.8.) IEV(IJ) = -31
0097      IF(RR(IJ).EQ.9.) IEV(IJ) = -19
0098      IF(RR(IJ).EQ.10.) IEV(IJ) = 6
0099      IF(RR(IJ).EQ.11.) IEV(IJ) = 6
0100      IF(RR(IJ).EQ.12.) IEV(IJ) = 19
0101      IF(RR(IJ).EQ.13.) IEV(IJ) = 31
0102      IF(RR(IJ).EQ.14.) IEV(IJ) = 45
0103      IF(RR(IJ).EQ.15.) IEV(IJ) = 59
0104      IF(RR(IJ).EQ.16.) IEV(IJ) = 75
0105      IF(RR(IJ).EQ.17.) IEV(IJ) = 92
0106      IF(RR(IJ).EQ.18.) IEV(IJ) = 113
0107      IF(RR(IJ).EQ.19.) IEV(IJ) = 141
0108      IF(RR(IJ).EQ.20.) IEV(IJ) = 187
0109      30 CONTINUE
0110         DO 31IK = 1,10
0111      31 ISUMT1 = ISUMT1+IEV(IK)
0112         DO 32IN = 1,20
0113      32 ISUMT2 = ISUMT2+IEV(IN)
0114         IF(ISUMT1.LT.ISUMT2) GO TO 33
0115         IT1 = ISUMT2
0116         GO TO 34
0117      33 IT1 = ISUMT1
0118      34 T1 = IT1/100.
0119         DO 35KK = 1,20
0120         EV(KK) = IEV(KK)/100.
0121      35 EXPP = EXPP+EV(KK)**2
0122         VART = N1*N2/(N1+N2-1.)*(EXPP/(N1+N2))
0123         TER = T1/SQRT(VART)

```

```

0124 ZTER = ABS(ITER)
0125 IF(ZTER.GE.1.96) CTER05 = CTER05+1
0126 IF(ZTER.GE.2.58) CTER01 = CTER01+1
C/ -----VAN DER WAERDEN-----
0127 DO 50JJ = 1,20
0128 IF(RR(JJ).EQ.1.) IZI(JJ) = -167
0129 IF(RR(JJ).EQ.2.) IZI(JJ) = -131
0130 IF(RR(JJ).EQ.3.) IZI(JJ) = -117
0131 IF(RR(JJ).EQ.4.) IZI(JJ) = -88
0132 IF(RR(JJ).EQ.5.) IZI(JJ) = -71
0133 IF(RR(JJ).EQ.6.) IZI(JJ) = -57
0134 IF(RR(JJ).EQ.7.) IZI(JJ) = -43
0135 IF(RR(JJ).EQ.8.) IZI(JJ) = 30
0136 IF(RR(JJ).EQ.9.) IZI(JJ) = -19
0137 IF(RR(JJ).EQ.10.) IZI(JJ) = -6
0138 IF(RR(JJ).EQ.11.) IZI(JJ) = 6
0139 IF(RR(JJ).EQ.12.) IZI(JJ) = 13
0140 IF(RR(JJ).EQ.13.) IZI(JJ) = 30
0141 IF(RR(JJ).EQ.14.) IZI(JJ) = 43
0142 IF(RR(JJ).EQ.15.) IZI(JJ) = 57
0143 IF(RR(JJ).EQ.16.) IZI(JJ) = 71
0144 IF(RR(JJ).EQ.17.) IZI(JJ) = 88
0145 IF(RR(JJ).EQ.18.) IZI(JJ) = 107
0146 IF(RR(JJ).EQ.19.) IZI(JJ) = 131
0147 IF(RR(JJ).EQ.20.) IZI(JJ) = 167
0148 50 CONTINUE
0149 DO 51LL = 1,10
0150 51 ISUMV1 = ISUMV1+IZI(LL)
0151 DO 52MM = 11,20
0152 52 ISUMV2 = ISUMV2+IZI(MM)
0153 IF(ISUMV1.LT.ISUMV2) GO TO 53
0154 ITV1 = ISUMV2
0155 GO TO 54
0156 53 ITV1 = ISUMV1
0157 54 TV1 = ITV1/100.
0158 DO 55NN = 1,20
0159 ZI(NN) = IZI(NN)/100.
0160 55 ZII = ZII+ZI(NN)**2/(N1+N2)
0161 VARV = N1*N2/(N1+N2 1.)*ZII
0162 VAN = TV1/SQRT(VARV)
0163 ZVAN = ABS(VAN)
0164 IF(ZVAN.GE.1.96) CVAN05 = CVAN05+1
0165 IF(ZVAN.GE.2.58) CVAN01 = CVAN01+1
0166 100 CONTINUE
0167 WRITE(3,200)
0168 200 FORMAT(/5X,'CTT05',5X,'CWIN05',5X,'CTER05',5X,'CVAN05')
0169 WRITE(3,300)CTT05,CWIN05,CTER05,CVAN05
0170 300 FORMAT(3X,F6.1,4X,F6.1,5X,F6.1,5X,F6.1)
0171 WRITE(3,400)
0172 400 FORMAT(/55X,'CTT01',5X,'CWIN01',5X,'CTER01',5X,'CVAN01')
0173 WRITE(3,500)CTT01,CWIN01,CTER01,CVAN01
0174 500 FORMAT(53X,F6.1,4X,F6.1,5X,F6.1,5X,F6.1)
0175 2500 CONTINUE
0176 STOP
0177 END

```

DCS FORTRAN IV 360N-FU-479 3-B MAINPGM DATE 12/23/84 TIME 02.04.13

```
C/-----RANDOM-----/
00C1      SUBROUTINE RANDOM(IX,IY,RN)
00C2      COMMON IA
00C3      IY = IX*65539
00C4      IF(IY)5,0,6
00C5      5 IY = IY+2147483647+1
00C6      6 RN = IY
00C7      RN = RN*.4656613E-9
00C8      IX = IY
00C9      IA = IX
0010      RETURN
0011      END
```



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จุฬาลงกรณ์มหาวิทยาลัย

DOS FORTRAN .IV 360N-FO-479.3-8

MAINPGM

DATE 15/03/83

TIME

22.54.04

0001
0002
0003
0004
0005
0006

C/-----UNIFORM-----

SUBROUTINE UNIFM(A,B,Z)
COMMON IA
CALL RANDOM(IA,IY,RN)
Z = A+(B-A)*RN
RETURN
END

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DCS FORTRAN IV 360N-10-479 3-8

MAINPGM

DATE 12/02/72

TIME 02.10.47

```

C/-----RANK-----
0001      SUBROUTINE RANK(A,R,N)
0002      DIMENSION A(20),R(20)
0003      DO 10 I = 1,N
0004      10 R(I) = 0.0
0005      DO 100 I = 1,N
0006      IF (R(I)) 20,20,100
0007      20 SMALL = 0.0
0008      EQUAL = 0.0
0009      X = A(I)
0010      DO 50 J = 1,N
0011      IF (A(J)-X) 30,40,50
0012      30 SMALL = SMALL+1.0
0013      GO TO 50
0014      40 EQUAL = EQUAL+1.0
0015      R(J) = -1.0
0016      50 CONTINUE
0017      IF (EQUAL-1.0) 60,60,70
0018      60 R(I) = SMALL+1.0
0019      GO TO 100
0020      70 P = SMALL+(EQUAL+1.0)*0.5
0021      DO 90 J = 1,N
0022      IF (R(J)+1.0) 90,80,90
0023      80 R(J) = P
0024      90 CONTINUE
0025      100 CONTINUE
0026      RETURN
0027      END

```

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จุฬาลงกรณ์มหาวิทยาลัย

DJS FORTRAN IV 360N-FD-479 3-8

MAINPGM

DATE 15/03/83

TIME 23.07.39

```

C *****
C *
C *
C *          UU : SAMPLE SIZE(N1) = 15
C *
C *
C *****
0001  DIMENSION NODAT(30),RR(30),R(30),EV(30),ZI(30),LEV(30),
      *IZI(30)
0002  COMMON IA
0003  REAL NODAT,N1,N2,MEAN1,MEAN2
0004  N1 = 15
0005  N2 = 15
C/-----
0006  DO 2000KKK = 1,8
0007  IA = 65539
0008  CTT05 = 0.
0009  CTT01 = 0.
0010  CWIN05 = 0.
0011  CWIN01 = 0.
0012  CTER05 = 0.
0013  CTER01 = 0.
0014  CVAN05 = 0.
0015  CVAN01 = 0.
C/-----
0016  DO 1001 = 1,1000
0017  STD = 10.
0018  SUM1 = 0.
0019  SUM2 = 0.
0020  SUMX1 = 0.
0021  SUMX2 = 0.
0022  SUMR1 = 0.
0023  SUMR2 = 0.
0024  EXPP = 0.
0025  ZII = 0.
0026  ISUMT1 = 0.
0027  ISUMT2 = 0.
0028  ISUMV1 = 0.
0029  ISUMV2 = 0.
0030  GO TO (19,12,13,14,15,16,17,18),KKK
C      THIS IS DESIGNED TO COMPUTE THE ACTUAL TYPE I ERROR
C      WHEN DELTA IS 0.05.D.
0031  19 EX = 500.
0032  GO TO 20
C      THIS IS DESIGNED TO COMPUTE THE POWER OF TESTS
C      WHEN DELTA IS 0.25S.D.
0033  12 EX = 502.5
0034  GO TO 20
C      THIS IS DESIGNED TO COMPUTE THE POWER OF TESTS
C      WHEN DELTA IS 0.5S.D.
0035  13 EX = 505.0
0036  GO TO 20
C      THIS IS DESIGNED TO COMPUTE THE POWER OF TESTS
C      WHEN DELTA IS 0.75S.D.
0037  14 EX = 507.5
0038  GO TO 20
C      THIS IS DESIGNED TO COMPUTE THE POWER OF TESTS
C      WHEN DELTA IS 1.0S.D.
0039  15 EX = 510.0
0040  GO TO 20
C      THIS IS DESIGNED TO COMPUTE THE POWER OF TESTS
C      WHEN DELTA IS 1.25S.D.
0041  16 EX = 512.5
0042  GO TO 20
C      THIS IS DESIGNED TO COMPUTE THE POWER OF TESTS
C      WHEN DELTA IS 1.5S.D.
0043  17 EX = 515.0
0044  GO TO 20
C      THIS IS DESIGNED TO COMPUTE THE POWER OF TESTS
C      WHEN DELTA IS 1.75S.D.
0045  18 EX = 517.5
0046  20 B = EX+(STD*SQRT(3.))
0047  A = (2.*EX) B

```



```

0048      DO 10J = 1,15
0049      CALL UNIFM(A,B,Z)
0050      10 NODAT(J) = Z
0051      EX = 500.
0052      B = EX*(STD*SQRT(3.))
0053      A = (2.*EX)-B
0054      DO 11IX = 16,30
0055      CALL UNIFM(A,B,Z)
0056      11 NODAT(IX) = Z

C/ ----- T TEST -----
0057      DO 11IQ = 1,15
0058      1 SUM1 = SUM1+NODAT(IQ)
0059      MEAN1 = SUM1/N1
0060      DO 8JQ = 1,15
0061      8 SUM2 = SUM2+(NODAT(JQ)-MEAN1)**2
0062      DO 2IB = 16,30
0063      2 SUMX1 = SUMX1+NODAT(1B)
0064      MEAN2 = SUMX1/N2
0065      DO 9KQ = 16,30
0066      9 SUMX2 = SUMX2+(NODAT(KQ)-MEAN2)**2
0067      XX = (SUM2+SUMX2)/(N1+N2-2.)*(1./N1+1./N2)
0068      TEST = (MEAN1-MEAN2)/SQRT(XX)
0069      TTEST = ABS(TEST)
0070      IF(TTEST.GE.2.048) CTT05 = CTT05+1
0071      IF(TTEST.GE.2.763) CTT01 = CTT01+1

C/ ----- WILCOXON -----
0072      N = 30
0073      CALL RANK(NODAT,R,N)
0074      DO 3K = 1,30
0075      3 RR(K) = R(K)
0076      DO 4L = 1,15
0077      4 SUMR1 = SUMR1+RR(L)
0078      DO 5M = 16,30
0079      5 SUMR2 = SUMR2+RR(M)
0080      IF(SUMR1.LT.SUMR2) GO TO 6
0081      TR1 = SUMR2
0082      GO TO 7
0083      6 TR1 = SUMR1
0084      7 WIN = (TR1-N1*(N1+N2+1.)/2.)/SQRT(N1*N2*(N1+N2+1.)/12.)
0085      ZWIN = ABS(WIN)
0086      IF(ZWIN.GE.1.96) CWIN05 = CWIN05+1
0087      IF(ZWIN.GE.2.58) CWIN01 = CWIN01+1

C/ ----- TERRY-HOEFFDING -----
0088      DO 30IJ = 1,30
0089      IF(RR(IJ).EQ.1.) IEV(IJ) = 204
0090      IF(RR(IJ).EQ.2.) IEV(IJ) = -162
0091      IF(RR(IJ).EQ.3.) IEV(IJ) = -136
0092      IF(RR(IJ).EQ.4.) IEV(IJ) = 113
0093      IF(RR(IJ).EQ.5.) IEV(IJ) = -103
0094      IF(RR(IJ).EQ.6.) IEV(IJ) = -89
0095      IF(RR(IJ).EQ.7.) IEV(IJ) = 79
0096      IF(RR(IJ).EQ.8.) IEV(IJ) = -67
0097      IF(RR(IJ).EQ.9.) IEV(IJ) = -57
0098      IF(RR(IJ).EQ.10.) IEV(IJ) = 47
0099      IF(RR(IJ).EQ.11.) IEV(IJ) = -39
0100      IF(RR(IJ).EQ.12.) IEV(IJ) = -29
0101      IF(RR(IJ).EQ.13.) IEV(IJ) = -21
0102      IF(RR(IJ).EQ.14.) IEV(IJ) = -12
0103      IF(RR(IJ).EQ.15.) IEV(IJ) = -4
0104      IF(RR(IJ).EQ.16.) IEV(IJ) = 4
0105      IF(RR(IJ).EQ.17.) IEV(IJ) = 12
0106      IF(RR(IJ).EQ.18.) IEV(IJ) = 21
0107      IF(RR(IJ).EQ.19.) IEV(IJ) = 29
0108      IF(RR(IJ).EQ.20.) IEV(IJ) = 38
0109      IF(RR(IJ).EQ.21.) IEV(IJ) = 47
0110      IF(RR(IJ).EQ.22.) IEV(IJ) = 57
0111      IF(RR(IJ).EQ.23.) IEV(IJ) = 67
0112      IF(RR(IJ).EQ.24.) IEV(IJ) = 78
0113      IF(RR(IJ).EQ.25.) IEV(IJ) = 89
0114      IF(RR(IJ).EQ.26.) IEV(IJ) = 103
0115      IF(RR(IJ).EQ.27.) IEV(IJ) = 113
0116      IF(RR(IJ).EQ.28.) IEV(IJ) = 136
0117      IF(RR(IJ).EQ.29.) IEV(IJ) = 162
0118      IF(RR(IJ).EQ.30.) IEV(IJ) = 204
0119      30 CONTINUE
0120      DO 31IK = 1,15
0121      31 ISUMT1 = ISUMT1+IEV(IK)
0122      DO 32IN = 16,30

```



```

0123      32 ISUMT2 = ISUMT2+IEV(IN)
0124      IF (ISUMT1.LT.ISUMT2) GO TO 33
0125      IT1 = ISUMT2
0126      GO TO 34
0127      33 IT1 = ISUMT1
0128      34 T1 = IT1/100.
0129      DO 35KK = 1,30
0130      EV(KK) = IEV(KK)/100.
0131      35 EXPP = EXPP+EV(KK)**2
0132      VART = N1*N2/(N1+N2-1.)*(EXPP/(N1+N2))
0133      TER = T1/SQRT(VART)
0134      ZTER = ABS(TER)
0135      IF (ZTER.GE.1.96) CTER05 = CTER05+1
0136      IF (ZTER.GE.2.58) CTER01 = CTER01+1
C/ -----VAN DER WAERDEN-----
0137      DO 50JJ = 1,30
0138      IF (RR(JJ).EQ.1.) IZI(JJ) = -185
0139      IF (RR(JJ).EQ.2.) IZI(JJ) = -152
0140      IF (RR(JJ).EQ.3.) IZI(JJ) = -130
0141      IF (RR(JJ).EQ.4.) IZI(JJ) = -113
0142      IF (RR(JJ).EQ.5.) IZI(JJ) = -99
0143      IF (RR(JJ).EQ.6.) IZI(JJ) = -86
0144      IF (RR(JJ).EQ.7.) IZI(JJ) = -75
0145      IF (RR(JJ).EQ.8.) IZI(JJ) = -65
0146      IF (RR(JJ).EQ.9.) IZI(JJ) = -55
0147      IF (RR(JJ).EQ.10.) IZI(JJ) = -46
0148      IF (RR(JJ).EQ.11.) IZI(JJ) = -37
0149      IF (RR(JJ).EQ.12.) IZI(JJ) = -29
0150      IF (RR(JJ).EQ.13.) IZI(JJ) = -20
0151      IF (RR(JJ).EQ.14.) IZI(JJ) = -12
0152      IF (RR(JJ).EQ.15.) IZI(JJ) = -4
0153      IF (RR(JJ).EQ.16.) IZI(JJ) = 4
0154      IF (RR(JJ).EQ.17.) IZI(JJ) = 12
0155      IF (RR(JJ).EQ.18.) IZI(JJ) = 20
0156      IF (RR(JJ).EQ.19.) IZI(JJ) = 29
0157      IF (RR(JJ).EQ.20.) IZI(JJ) = 37
0158      IF (RR(JJ).EQ.21.) IZI(JJ) = 46
0159      IF (RR(JJ).EQ.22.) IZI(JJ) = 55
0160      IF (RR(JJ).EQ.23.) IZI(JJ) = 65
0161      IF (RR(JJ).EQ.24.) IZI(JJ) = 75
0162      IF (RR(JJ).EQ.25.) IZI(JJ) = 86
0163      IF (RR(JJ).EQ.26.) IZI(JJ) = 99
0164      IF (RR(JJ).EQ.27.) IZI(JJ) = 113
0165      IF (RR(JJ).EQ.28.) IZI(JJ) = 130
0166      IF (RR(JJ).EQ.29.) IZI(JJ) = 152
0167      IF (RR(JJ).EQ.30.) IZI(JJ) = 185
0168      50 CONTINUE
0169      DO 51LL = 1,15
0170      51 ISUMV1 = ISUMV1+IZI(LL)
0171      DO 52MM = 16,30
0172      52 ISUMV2 = ISUMV2+IZI(MM)
0173      IF (ISUMV1.LT.ISUMV2) GO TO 53
0174      ITV1 = ISUMV2
0175      GO TO 54
0176      53 ITV1 = ISUMV1
0177      54 TV1 = ITV1/100.
0178      DO 55NN = 1,30
0179      ZI(NN) = IZI(NN)/100.
0180      55 ZII = ZII+ZI(NN)**2/(N1+N2)
0181      VARV = N1*N2/(N1+N2-1.)*ZII
0182      VAN = TV1/SQRT(VARV)
0183      ZVAN = ABS(VAN)
0184      IF (ZVAN.GE.1.96) CVAN05 = CVAN05+1
0185      IF (ZVAN.GE.2.58) CVAN01 = CVAN01+1
0186      100 CONTINUE
0187      WRITE(3,200)
0188      200 FORMAT(//5X,'CTT05',5X,'CWIN05',5X,'CTER05',5X,'CVAN05')
0189      WRITE(3,300)CTT05,CWIN05,CTER05,CVAN05
0190      300 FORMAT(3X,F6.1,4X,F6.1,5X,F6.1,5X,F6.1)
0191      WRITE(3,400)
0192      400 FORMAT(//55X,'CTT01',5X,'CWIN01',5X,'CTER01',5X,'CVAN01')
0193      WRITE(3,500)CTT01,CWIN01,CTER01,CVAN01
0194      500 FORMAT(53X,F6.1,4X,F6.1,5X,F6.1,5X,F6.1)
0195      2000 CONTINUE
0196      STOP
0197      END

```

DCS FCRI/RAN IV 360N-FO-479 3-8

MAINPGM

DATE 12/03/83

TIME 02.04.13

```
C/-----RANDOM-----/
00C1      SUBROUTINE RANDCM(IX,IY,RN)
00C2      COMMON IA
00C3      IY = IX*65539
00C4      IF(IY)5,6,6
00C5      5 IY = IY+2147483647+1
00C6      6 RN = IY
00C7      RN = RN*.4656613E-9
00C8      IX = IY
00C9      IA = IX
0010      RETURN
0011      END
```



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DOS FORTRAN ,IV 360N-FO-479 3-8

MAINPGM

DATE 15/03/83

TIME

22.54.04

0001
0002
0003
0004
0005
0006

C/-----UNIFORM-----

SUBROUTINE UNIFM(A,B,Z)
COMMON IA
CALL RANDOM(IA,IY,RN)
Z = A+(B-A)*RN
RETURN
END

ศูนย์วิทยทรัพยากร
จุฬาลงกรณ์มหาวิทยาลัย

CLS FORTRAN IV 360H-PO-479 3-8

MAINPAG

DATE 12/12/65

TIME

02.17.12

```

C/-----KARK-----
0001      SUBROUTINE RANK(A,R,N)
0002      DIMENSION A(30),R(30)
0003      DO 101 = 1,N
0004      10 R(I) = 0.0
0005      DO 1001 = 1,N
0006      IF(R(I))20,20,100
0007      20 SMALL = 0.0
0008      EQUAL = 0.0
0009      X = A(I)
0010      DO 50J = 1,N
0011      IF(A(J)-X)30,40,50
0012      30 SMALL = SMALL+1.0
0013      GO TO 50
0014      40 EQUAL = EQUAL+1.0
0015      R(J) = -1.0
0016      50 CONTINUE
0017      IF(EQUAL-1.0)60,60,70
0018      60 R(I) = SMALL+1.0
0019      GO TO 100
0020      70 P = SMALL+(EQUAL+1.0)*0.5
0021      DO 90J = 1,N
0022      IF(R(J)+1.0)90,80,90
0023      80 R(J) = P
0024      90 CONTINUE
0025      100 CONTINUE
0026      RETURN
0027      END

```

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DUS FORTRAN IV 350N FD-479 3-8

MAINPGM

DATE 15/03/83

TIME 23.14.54

```

C *****
C *
C *
C *          LL : SAMPLE SIZE(N1) = 5
C *
C *
C *****
0001  DIMENSION NODAT(10),RR(1),R(10),EV(10),ZI(10),IEV(10),
      *IZI(10)
0002  COMMON IA
0003  REAL NODAT,N1,N2,MEAN1,MEAN2
0004  N1 = 5
0005  N2 = 5
C /-----
0006  DO 2000 KKK = 1,8
0007  IA = 65539
0008  CTT05 = 0.
0009  CTT01 = 0.
0010  CWIN05 = 0.
0011  CWIN01 = 0.
0012  CTER05 = 0.
0013  CTER01 = 0.
0014  CVAN05 = 0.
0015  CVAN01 = 0.
C /-----
0016  DO 1001 = 1,1000
0017  STD = 10.
0018  SUM1 = 0.
0019  SUM2 = 0.
0020  SUMX1 = 0.
0021  SUMX2 = 0.
0022  SUMR1 = 0.
0023  SUMR2 = 0.
0024  ISUMT1 = 0.
0025  ISUMT2 = 0.
0026  ISUMV1 = 0.
0027  ISUMV2 = 0.
0028  GO TO (19,12,13,14,15,16,17,18),KKK
C      THIS IS DESIGNED TO COMPUTE THE ACTUAL TYPE I ERROR
C      WHEN DELTA IS 0.05.D.
0029  19 EX = 500.
0030  GO TO 20
C      THIS IS DESIGNED TO COMPUTE THE POWER OF TESTS
C      WHEN DELTA IS 0.25S.D.
0031  12 EX = 502.5
0032  GO TO 20
C      THIS IS DESIGNED TO COMPUTE THE POWER OF TESTS
C      WHEN DELTA IS 0.5S.D.
0033  13 EX = 505.0
0034  GO TO 20
C      THIS IS DESIGNED TO COMPUTE THE POWER OF TESTS
C      WHEN DELTA IS 0.75S.D.
0035  14 EX = 507.5
0036  GO TO 20
C      THIS IS DESIGNED TO COMPUTE THE POWER OF TESTS
C      WHEN DELTA IS 1.0S.D.
0037  15 EX = 510.0
0038  GO TO 20
C      THIS IS DESIGNED TO COMPUTE THE POWER OF TESTS
C      WHEN DELTA IS 1.25S.D.
0039  16 EX = 512.5
0040  GO TO 20
C      THIS IS DESIGNED TO COMPUTE THE POWER OF TESTS
C      WHEN DELTA IS 1.50S.D.
0041  17 EX = 515.0
0042  GO TO 20
C      THIS IS DESIGNED TO COMPUTE THE POWER OF TESTS
C      WHEN DELTA IS 1.75S.D.
0043  18 EX = 517.5
0044  20 DO 10J = 1,5
0045  CALL LOGIS(EX,STD,G)
0046  LU NODAT(J) = G
0047  EX = 500.

```

```

0048      DO 11IX = 6,10
0049      CALL LOGIS(IX,ST0,G)
0050      11 NODAT(IX) = G
C/-----T TEST-----
0051      DO 11Q = 1,5
0052      1 SUM1 = SUM1+NODAT(IQ)
0053      MEAN1 = SUM1/N1
0054      DO 8JQ = 1,5
0055      8 SUM2 = SUM2+(NODAT(JQ)-MEAN1)**2
0056      DO 21B = 6,10
0057      2 SUMX1 = SUMX1+NODAT(1B)
0058      MEAN2 = SUMX1/N2
0059      DO 9KQ = 6,10
0060      9 SUMX2 = SUMX2+(NODAT(KQ)-MEAN2)**2
0061      XX = (SUM2+SUMX2)/(N1+N2-2.)*(1./N1+1./N2)
0062      TEST = (MEAN1-MEAN2)/SQRT(XX)
0063      TTEST = ABS(TTEST)
0064      IF(TTEST.GE.2.306) CTT05 = CTT05+1
0065      IF(TTEST.GE.3.355) CTT01 = CTT01+1
C/-----WILCOXON-----
0066      N = 10
0067      CALL RANK(NODAT,R,N)
0068      DO 3K = 1,10
0069      3 RR(K) = R(K)
0070      DO 4L = 1,5
0071      4 SUMR1 = SUMR1+RR(L)
0072      DO 5M = 6,10
0073      5 SUMR2 = SUMR2+RR(M)
0074      IF(SUMR1.LT.SUMR2) GO TO 6
0075      TR1 = SUMR2
0076      GO TO 7
0077      6 TR1 = SUMR1
0078      7 IF(TR1.LE.10.0) CWIN05 = CWIN05+1
0079      IF(TR1.LE.15.0) CWIN01 = CWIN01+1
C/-----TERRY HJEFFDING-----
0080      DO 30IJ = 1,10
0081      IF(RR(IJ).EQ.1.) IEV(IJ) = -154
0082      IF(RR(IJ).EQ.2.) IEV(IJ) = -100
0083      IF(RR(IJ).EQ.3.) IEV(IJ) = -66
0084      IF(RR(IJ).EQ.4.) IEV(IJ) = -39
0085      IF(RR(IJ).EQ.5.) IEV(IJ) = -12
0086      IF(RR(IJ).EQ.6.) IEV(IJ) = 12
0087      IF(RR(IJ).EQ.7.) IEV(IJ) = 38
0088      IF(RR(IJ).EQ.8.) IEV(IJ) = 66
0089      IF(RR(IJ).EQ.9.) IEV(IJ) = 100
0090      IF(RR(IJ).EQ.10.) IEV(IJ) = 154
0091      30 CONTINUE
0092      DO 31IK = 1,5
0093      31 ISUMT1 = ISUMT1+IEV(IK)
0094      DO 32IN = 6,10
0095      32 ISUMT2 = ISUMT2+IEV(IN)
0096      IF(ISUMT1.GT.ISUMT2) GO TO 33
0097      IT1 = ISUMT2
0098      GO TO 34
0099      33 IT1 = ISUMT1
0100      34 IF(IT1.GE.292) CTER05 = CTER05+1
0101      IF(IT1.GE.370) CTER01 = CTER01+1
C/-----VAN DER WAERDEN-----
0102      DO 50JJ = 1,10
0103      IF(RR(JJ).EQ.1.) IZI(JJ) = -134
0104      IF(RR(JJ).EQ.2.) IZI(JJ) = -91
0105      IF(RR(JJ).EQ.3.) IZI(JJ) = -60
0106      IF(RR(JJ).EQ.4.) IZI(JJ) = -35
0107      IF(RR(JJ).EQ.5.) IZI(JJ) = -11
0108      IF(RR(JJ).EQ.6.) IZI(JJ) = 11
0109      IF(RR(JJ).EQ.7.) IZI(JJ) = 35
0110      IF(RR(JJ).EQ.8.) IZI(JJ) = 60
0111      IF(RR(JJ).EQ.9.) IZI(JJ) = 91
0112      IF(RR(JJ).EQ.10.) IZI(JJ) = 134
0113      50 CONTINUE
0114      DO 51LL = 1,5
0115      51 ISUMV1 = ISUMV1+IZI(LL)
0116      DO 52MM = 6,10
0117      52 ISUMV2 = ISUMV2+IZI(MM)
0118      IF(ISUMV1.GT.ISUMV2) GO TO 53
0119      ITV1 = ISUMV2
0120      GO TO 54
0121      53 ITV1 = ISUMV1

```

```

0122      54 IF(ITV1.GE.260) CVAN05 = CVAN05+1
0123      IF(ITV1.GE.331) CVAN01 = CVAN01+1
0124      100 CONTINUE
0125      WRITE(3,200)
0126      200 FORMAT(/5X,'CTT05',5X,'CWIN05',5X,'CTER05',5X,'CVAN05')
0127      WRITE(3,300)CTT05,CWIN05,CTER05,CVAN05
0128      300 FORMAT(3X,F6.1,4X,F6.1,5X,F6.1,5X,F6.1)
0129      WRITE(3,400)
0130      400 FORMAT(/55X,'CTT01',5X,'CWIN01',5X,'CTER01',5X,'CVAN01')
0131      WRITE(3,500)CTT01,CWIN01,CTER01,CVAN01
0132      500 FORMAT(53X,F6.1,4X,F6.1,5X,F6.1,5X,F6.1)
0133      2000 CONTINUE
0134      STOP
0135      END

```



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จุฬาลงกรณ์มหาวิทยาลัย

DCS FCIRAN IV 360N-FO-479 3-8

MAINPGM

DATE 12/03/83

TIME 02.04.13

```
C/-----RANDM1-----/
00C1  SUBROUTINE RANDCM(IX,IY,RN)
00C2  COMMON IA
00C3  IY = IX*65539
00C4  IF(IY)5,6,6
00C5  5 IY = IY+2147483647+1
00C6  6 RN = .IY
00C7  RN = RN*.4656613E-9
00C9  IX = IY
00C9  IA = IX
0010  RETURN
0011  END
```



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DUS FORTRAN IV 360N-FO-479 3-8

MAINPGM

DATE 15/03/83

TIME

23.15.39

```
C / ----- LOGISTIC -----  
0001 SUBROUTINE LOGIS(EX,STD,G)  
0002 COMMON IA  
0003 1 CALL RANDOM(IA,IY,RN)  
0004 IF(RN.LE.0.0)GO TO 1  
0005 XL = ALDG(RN)-ALDG(1.0-RN)  
0006 XL = XL*SQRT(3.0)/3.141593  
0007 G = EX+STD*XL  
0008 RETURN  
0009 END
```



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COS FORTRAN IV 360N-FD-479 3-8

MAINPGM

DATE 12/03/83

TIME 12.05.36

```

C/-----RANK-----/
0001      SUBROUTINE RANK(A,R,N)
0002      DIMENSION A(10),R(10)
0003      DO 10I = 1,N
0004      10 R(I) = 0.0
0005      DO 100I = 1,N
0006      IF(R(I))20,20,100
0007      20 SMALL = 0.0
0008      EQUAL = 0.0
0009      X = A(I)
0010      DO 50J = 1,N
0011      IF(A(J)-X)30,40,50
0012      30 SMALL = SMALL+1.0
0013      GO TO 50
0014      40 EQUAL = EQUAL+1.0
0015      R(J) = -1.0
0016      50 CONTINUE
0017      IF(EQUAL-1.0)60,60,70
0018      60 R(I) = SMALL+1.0
0019      GO TO 100
0020      70 P = SMALL+(EQUAL+1.0)*0.5
0021      DO 90J = 1,N
0022      IF(R(J)+1.0)90,80,90
0023      90 R(J) = P
0024      80 CONTINUE
0025      100 CONTINUE
0026      RETURN
0027      END

```

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จุฬาลงกรณ์มหาวิทยาลัย

```

C *****
C *
C *
C *          LL : SAMPLE SIZE(N1) = 10
C *
C *
C *****
0001 DIMENSION NODAT(20),FK(20),K(20),EV(20),Z1(20),LEV(20),
      *LZ1(20)
0002 COMMON IA
0003 REAL NODAT,N1,N2,MEAN1,MEAN2
0004 N1 = 10
0005 N2 = 10
C/-----
0006 DO 2000KKK = 1,8
0007 IA = 65539
0008 CT105 = 0.
0009 CT101 = 0.
0010 CWIN05 = 0.
0011 CWIN01 = 0.
0012 CTER05 = 0.
0013 CTER01 = 0.
0014 CVAN05 = 0.
0015 CVAN01 = 0.
C/-----
0016 DO 1001 = 1,1000
0017 STD = 10.
0018 SUM1 = 0.
0019 SUM2 = 0.
0020 SUMX1 = 0.
0021 SUMX2 = 0.
0022 SUMR1 = 0.
0023 SUMR2 = 0.
0024 FXPP = 0.
0025 Z11 = 0.
0026 ISUMT1 = 0.
0027 ISUMT2 = 0.
0028 ISUMV1 = 0.
0029 ISUMV2 = 0.
0030 GO TO (11,12,13,14,15,16,17,18),KKK
C THIS IS DESIGNED TO COMPUTE THE ACTUAL TYPE I ERROR
C WHEN DELTA IS 0.05.D.
0031 19 EX = 500.
0032 GO TO 20
C THIS IS DESIGNED TO COMPUTE THE POWER OF TESTS
C WHEN DELTA IS 0.25S.D.
0033 12 EX = 502.5
0034 GO TO 20
C THIS IS DESIGNED TO COMPUTE THE POWER OF TESTS
C WHEN DELTA IS 0.5S.D.
0035 13 EX = 505.0
0036 GO TO 20
C THIS IS DESIGNED TO COMPUTE THE POWER OF TESTS
C WHEN DELTA IS 0.75S.D.
0037 14 EX = 507.5
0038 GO TO 20
C THIS IS DESIGNED TO COMPUTE THE POWER OF TESTS
C WHEN DELTA IS 1.0S.D.
0039 15 EX = 510.0
0040 GO TO 20
C THIS IS DESIGNED TO COMPUTE THE POWER OF TESTS
C WHEN DELTA IS 1.25S.D.
0041 16 EX = 512.5
0042 GO TO 20
C THIS IS DESIGNED TO COMPUTE THE POWER OF TESTS
C WHEN DELTA IS 1.5S.D.
0043 17 EX = 515.0
0044 GO TO 20
C THIS IS DESIGNED TO COMPUTE THE POWER OF TESTS
C WHEN DELTA IS 1.75S.D.
0045 18 EX = 517.5
0046 20 DO 10J = 1,10
0047 CALL LOGIS(EX,STD,0)

```

```

0048      10 NODAT(J) = G
0049          EX = 500.
0050          DO 11 IX = 11,20
0051          CALL LOGIS(EX,STG,G)
0052      11 NODAT(IX) = G
C/-----I-TEST-----
0053          DO 11Q = 1,10
0054      1 SUM1 = SUM1+NODAT(1Q)
0055          MEAN1 = SUM1/N1
0056          DO 8JQ = 1,10
0057      8 SUM2 = SUM2+(NODAT(JQ)-MEAN1)**2
0058          DO 2IB = 11,20
0059      2 SUMX1 = SUMX1+NODAT(1B)
0060          MEAN2 = SUMX1/N2
0061          DO 9KQ = 11,20
0062      9 SUMX2 = SUMX2+(NODAT(KQ)-MEAN2)**2
0063          XX = (SUM2+SUMX2)/(N1+N2-2.)*(1./N1+1./N2)
0064          TEST = (MEAN1-MEAN2)/SQRT(XX)
0065          TTEST = ABS(TEST)
0066          IF(TTEST.GE.2.101) CTT05 = CTT05+1
0067          IF(TTEST.GE.2.878) CTT01 = CTT01+1
C/-----WILCOXON-----
0068          N = 20
0069          CALL RANK(NODAT,R,N)
0070          DO 3K = 1,20
0071      3 RR(K) = R(K)
0072          DO 4L = 1,10
0073      4 SUMR1 = SUMR1+RR(L)
0074          DO 5M = 11,20
0075      5 SUMR2 = SUMR2+RR(M)
0076          IF(SUMR1.LT.SUMR2) GO TO 6
0077          TR1 = SUMR2
0078          GO TO 7
0079      6 TR1 = SUMR1
0080      7 WIN = (TR1-N1*(N1+N2+1.)/2.)/SQRT(N1*N2*(N1+N2+1.)/12.)
0081          ZWIN = ABS(WIN)
0082          IF(ZWIN.GE.1.96) CWIN05 = CWIN05+1
0083          IF(ZWIN.GE.2.58) CWIN01 = CWIN01+1
C/-----TERRY-HOEFFDING-----
0084          DO 30IJ = 1,20
0085          IF(RR(IJ).EQ.1.) IEV(IJ) = -187
0086          IF(RR(IJ).EQ.2.) IEV(IJ) = -141
0087          IF(RR(IJ).EQ.3.) IEV(IJ) = -113
0088          IF(RR(IJ).EQ.4.) IEV(IJ) = -92
0089          IF(RR(IJ).EQ.5.) IEV(IJ) = -75
0090          IF(RR(IJ).EQ.6.) IEV(IJ) = -59
0091          IF(RR(IJ).EQ.7.) IEV(IJ) = -45
0092          IF(RR(IJ).EQ.8.) IEV(IJ) = -31
0093          IF(RR(IJ).EQ.9.) IEV(IJ) = -19
0094          IF(RR(IJ).EQ.10.) IEV(IJ) = -6
0095          IF(RR(IJ).EQ.11.) IEV(IJ) = 6
0096          IF(RR(IJ).EQ.12.) IEV(IJ) = 19
0097          IF(RR(IJ).EQ.13.) IEV(IJ) = 31
0098          IF(RR(IJ).EQ.14.) IEV(IJ) = 45
0099          IF(RR(IJ).EQ.15.) IEV(IJ) = 59
0100          IF(RR(IJ).EQ.16.) IEV(IJ) = 75
0101          IF(RR(IJ).EQ.17.) IEV(IJ) = 92
0102          IF(RR(IJ).EQ.18.) IEV(IJ) = 113
0103          IF(RR(IJ).EQ.19.) IEV(IJ) = 141
0104          IF(RR(IJ).EQ.20.) IEV(IJ) = 187
0105      30 CONTINUE
0106          DO 31IK = 1,10
0107      31 ISUMT1 = ISUMT1+IEV(IK)
0108          DO 32IN = 11,20
0109      32 ISUMT2 = ISUMT2+IEV(IN)
0110          IF(ISUMT1.LT.ISUMT2) GO TO 33
0111          IT1 = ISUMT2
0112          GO TO 34
0113      33 IT1 = ISUMT1
0114      34 Y1 = IT1/100.
0115          DO 35KK = 1,20
0116          EV(KK) = IEV(KK)/100.
0117      35 EXPP = EXPP+EV(KK)**2
0118          VART = N1*N2/(N1+N2-1.)*(EXPP/(N1+N2))
0119          TER = T1/SQRT(VART)
0120          ZTER = ABS(TER)
0121          IF(ZTER.GE.1.96) CTER05 = CTER05+1
0122          IF(ZTER.GE.2.58) CTER01 = CTER01+1

```

```

C/-----VAN DER WAFFDEN-----
0123      DO 50JJ = 1,20
0124      IF(RR(JJ).EQ.1.) IZ1(JJ) = -167
0125      IF(RR(JJ).EQ.2.) IZ1(JJ) = -151
0126      IF(RR(JJ).EQ.3.) IZ1(JJ) = -107
0127      IF(RR(JJ).EQ.4.) IZ1(JJ) = -98
0128      IF(RR(JJ).EQ.5.) IZ1(JJ) = -71
0129      IF(RR(JJ).EQ.6.) IZ1(JJ) = -57
0130      IF(RR(JJ).EQ.7.) IZ1(JJ) = -43
0131      IF(RR(JJ).EQ.8.) IZ1(JJ) = -30
0132      IF(RR(JJ).EQ.9.) IZ1(JJ) = -18
0133      IF(RR(JJ).EQ.10.) IZ1(JJ) = -6
0134      IF(RR(JJ).EQ.11.) IZ1(JJ) = 6
0135      IF(RR(JJ).EQ.12.) IZ1(JJ) = 18
0136      IF(RR(JJ).EQ.13.) IZ1(JJ) = 30
0137      IF(RR(JJ).EQ.14.) IZ1(JJ) = 43
0138      IF(RR(JJ).EQ.15.) IZ1(JJ) = 57
0139      IF(RR(JJ).EQ.16.) IZ1(JJ) = 71
0140      IF(RR(JJ).EQ.17.) IZ1(JJ) = 98
0141      IF(RR(JJ).EQ.18.) IZ1(JJ) = 107
0142      IF(RR(JJ).EQ.19.) IZ1(JJ) = 121
0143      IF(RR(JJ).EQ.20.) IZ1(JJ) = 167
0144      50 CONTINUE
0145      DO 51LL = 1,10
0146      51 ISUMV1 = ISUMV1+IZ1(LL)
0147      DO 52MM = 11,20
0148      52 ISUMV2 = ISUMV2+IZ1(MM)
0149      IF((ISUMV1.LT.ISUMV2) GO TO 53
0150      ITV1 = ISUMV2
0151      GO TO 54
0152      53 ITV1 = ISUMV1
0153      54 TV1 = ITV1/100.
0154      DO 55NN = 1,20
0155      Z1(NN) = IZ1(NN)/100.
0156      55 Z11 = Z11+Z1(NN)**2/(N1+N2)
0157      VARV = N1*N2/(N1+N2-1.)*Z11
0158      VAN = TV1/SQRT(VARV)
0159      ZVAN = ABS(VAN)
0160      IF(ZVAN.GE.1.96) CVAN05 = CVAN05+1
0161      IF(ZVAN.GE.2.58) CVAN01 = CVAN01+1
0162      100 CONTINUE
0163      WRITE(3,200)
0164      200 FORMAT(/75X,'CTT05',5X,'CWIN05',5X,'CTFR05',5X,'CVAN05')
0165      WRITE(3,300)CTT05,CWIN05,CTFR05,CVAN05
0166      300 FORMAT(2X,F6.1,4X,F6.1,5X,F6.1,5X,F6.1)
0167      WRITE(3,400)
0168      400 FORMAT(/55X,'CTT01',5X,'CWIN01',5X,'CTFR01',5X,'CVAN01')
0169      WRITE(3,500)CTT01,CWIN01,CTFR01,CVAN01
0170      500 FORMAT(53X,F6.1,4X,F6.1,5X,F6.1,5X,F6.1)
0171      2000 CONTINUE
0172      STOP
0173      END

```

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DCS FCIRAN IV 363N-FO-479 3-B MAINPGM DATE 12/03/83 TIME 02.04.13

```
C/-----RANDOM-----/
0001      SUBROUTINE RANDCM(IX,IY,ENI)
0002      COMMON IA
0003      IY = IX*65539
0004      IF(IY)5,6,6
0005      5 IY = IY+2147483647+1
0006      6 RN = IY
0007      RN = RN*.4656613E-9
0008      IX = IY
0009      IA = IX
0010      RETURN
0011      END
```



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DOS FORTRAN IV 360N-FO-479 3-8

MAINPGM

DATE 15/03/83

TIME

23.15.39

0001
0002
0003
0004
0005
0006
0007
0008
0009

```
C / ----- LOGISTIC -----  
SUBROUTINE LOGIS(EX,STD,G)  
COMMON IA  
1 CALL RANDOM(IA,IY,RN)  
IF(RN.LE.0.0)GO TO 1  
XL = ALOG(RN)-ALOG(1.0-RN)  
XL = XL*SQRT(3.0)/3.141593  
G = EX+STD*XL  
RETURN  
END
```



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จุฬาลงกรณ์มหาวิทยาลัย

DCS FORTRAN IV 360N-FD-472.3-8 MAINPGM

DATE 12/03/02

TIME 02.10.40

```

C/-----RANK-----
0001      SUBROUTINE RANK(A,R,N)
0002      DIMENSION A(20),R(20)
0003      DC 10 I = 1,N
0004      10 R(I) = 0.0
0005      DO 100 I = 1,N
0006      IF(R(I))20,20,100
0007      20 SMALL = C.C
0008      EQUAL = J.0
0009      X = A(I)
0010      DO 50 J = 1,N
0011      IF(A(J)-X)30,40,50
0012      30 SMALL = SMALL+1.0
0013      GO TO 50
0014      40 EQUAL = EQUAL+1.0
0015      R(J) = -1.0
0016      50 CONTINUE
0017      IF(EQUAL-1.0)60,60,70
0018      60 R(I) = SMALL+1.0
0019      GO TO 100
0020      70 P = SMALL+(EQUAL+1.0)*0.5
0021      DO 90 J = 1,N
0022      IF(R(J)+1.0)90,80,90
0023      80 R(J) = P
0024      90 CONTINUE
0025      100 CONTINUE
0026      RETURN
0027      END

```

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จุฬาลงกรณ์มหาวิทยาลัย

```

C *****
C *
C *
C *          LL : SAMPLE SIZE(N1) = 15
C *
C *
C *****
0001      DIMENSION NODAT(30),RR(30),R(30),CV(30),Z1(30),TEV(30),
          *I21(30)
0002      COMMON IA
0003      REAL NODAT,N1,N2,MEAN1,MEAN2
0004      N1 = 15
0005      N2 = 15
C/-----
0006      DO 20COKKK = 1,8
0007      IA = 65539
0008      CTI05 = 0.
0009      CTI01 = 0.
0010      CWIN05 = 0.
0011      CWIN01 = 0.
0012      CTER05 = 0.
0013      CTER01 = 0.
0014      CVANC5 = 0.
0015      CVANC1 = 0.
C/-----
0016      CO 1001 = 1,1000
0017      STD = 10.
0018      SUM1 = 0.
0019      SUM2 = 0.
0020      SUMX1 = 0.
0021      SUMX2 = 0.
0022      SUMR1 = 0.
0023      SUMR2 = 0.
0024      EXPP = 0.
0025      Z11 = 0.
0026      ISUMT1 = 0.
0027      ISUMT2 = 0.
0028      ISUMV1 = 0.
0029      ISUMV2 = 0.
0030      GO TO (19,12,13,14,15,16,17,18),KKK
C          THIS IS DESIGNED TO COMPUTE THE ACTUAL TYPE I ERROR
C          WHEN DELTA IS 0.05.D.
0031      19 EX = 500.
0032      GO TO 20
C          THIS IS DESIGNED TO COMPUTE THE POWER OF TESTS
C          WHEN DELTA IS 0.25S.D.
0033      12 EX = 502.5
0034      GO TO 20
C          THIS IS DESIGNED TO COMPUTE THE POWER OF TESTS
C          WHEN DELTA IS 0.5S.D.
0035      13 EX = 505.0
0036      GO TO 20
C          THIS IS DESIGNED TO COMPUTE THE POWER OF TESTS
C          WHEN DELTA IS 0.75S.D.
0037      14 EX = 507.5
0038      GO TO 20
C          THIS IS DESIGNED TO COMPUTE THE POWER OF TESTS
C          WHEN DELTA IS 1.0S.D.
0039      15 EX = 510.0
0040      GO TO 20
C          THIS IS DESIGNED TO COMPUTE THE POWER OF TESTS
C          WHEN DELTA IS 1.25S.D.
0041      16 EX = 512.5
0042      GO TO 20
C          THIS IS DESIGNED TO COMPUTE THE POWER OF TESTS
C          WHEN DELTA IS 1.50S.D.
0043      17 EX = 515.0
0044      GO TO 20
C          THIS IS DESIGNED TO COMPUTE THE POWER OF TESTS
C          WHEN DELTA IS 1.75S.D.
0045      18 EX = 517.5
0046      20 DO 10J = 1,15
0047      CALL LOGS1EX,STD,G)

```

```

C048      10 NODAT(J) = G
C049      EX = 500.
C050      DO 11IX = 16,30
C051      CALL LOGIS(EX,STD,G)
C052      11 NODAT(IX) = G

C/-----T-TEST-----
C053      DO 11Q = 1,15
C054      1 SUM1 = SUM1+NODAT(1Q)
C055      MEAN1 = SUM1/N1
C056      DO 8JQ = 1,15
C057      8 SUM2 = SUM2+(NODAT(JQ)-MEAN1)**2
C058      DO 21B = 16,30
C059      2 SUMX1 = SUMX1+NODAT(1B)
C060      MEAN2 = SUMX1/N2
C061      DO 9KC = 16,30
C062      9 SUMX2 = SUMX2+(NODAT(KC)-MEAN2)**2
C063      XX = (SUM2+SUMX2)/(N1+N2-2.)*(1./N1+1./N2)
C064      TEST = (MEAN1-MEAN2)/SQRT(XX)
C065      TTEST = ABS(TEST)
C066      IF(TTEST.GE.2.049) CTT05 = CTT05+1
C067      IF(TTEST.GE.2.763) CTT01 = CTT01+1

C/-----WILCOXON-----
C068      N = 30
C069      CALL RANK(NODAT,R,N)
C070      DO 3K = 1,30
C071      3 RR(K) = R(K)
C072      DO 4L = 1,15
C073      4 SUMR1 = SUMR1+RR(L)
C074      DO 5M = 16,30
C075      5 SUMR2 = SUMR2+RR(M)
C076      IF(SUMR1.LT.SUMR2) GO TO 6
C077      TR1 = SUMR2
C078      GO TO 7
C079      6 TR1 = SUMR1
C080      7 WIN = (TR1-N1*(N1+N2+1.)/2.)/SQRT(N1*N2*(N1+N2+1.)/12.)
C081      ZWIN = ABS(WIN)
C082      IF(ZWIN.GE.1.96) CWIN05 = CWIN05+1
C083      IF(ZWIN.GE.2.58) CWIN01 = CWIN01+1

C/-----TERRY-BODDFING-----
C084      DO 30IJ = 1,30
C085      IF(RR(IJ).EQ.1.) IEV(IJ) = -204
C086      IF(RR(IJ).EQ.2.) IEV(IJ) = -192
C087      IF(RR(IJ).EQ.3.) IEV(IJ) = -176
C088      IF(RR(IJ).EQ.4.) IEV(IJ) = -118
C089      IF(RR(IJ).EQ.5.) IEV(IJ) = -103
C090      IF(RR(IJ).EQ.6.) IEV(IJ) = -95
C091      IF(RR(IJ).EQ.7.) IEV(IJ) = -78
C092      IF(RR(IJ).EQ.8.) IEV(IJ) = -67
C093      IF(RR(IJ).EQ.9.) IEV(IJ) = -57
C094      IF(RR(IJ).EQ.10.) IEV(IJ) = -47
C095      IF(RR(IJ).EQ.11.) IEV(IJ) = -38
C096      IF(RR(IJ).EQ.12.) IEV(IJ) = -29
C097      IF(RR(IJ).EQ.13.) IEV(IJ) = -21
C098      IF(RR(IJ).EQ.14.) IEV(IJ) = -12
C099      IF(RR(IJ).EQ.15.) IEV(IJ) = -4
C100      IF(RR(IJ).EQ.16.) IEV(IJ) = 4
C101      IF(RR(IJ).EQ.17.) IEV(IJ) = 12
C102      IF(RR(IJ).EQ.18.) IEV(IJ) = 21
C103      IF(RR(IJ).EQ.19.) IEV(IJ) = 29
C104      IF(RR(IJ).EQ.20.) IEV(IJ) = 38
C105      IF(RR(IJ).EQ.21.) IEV(IJ) = 47
C106      IF(RR(IJ).EQ.22.) IEV(IJ) = 57
C107      IF(RR(IJ).EQ.23.) IEV(IJ) = 67
C108      IF(RR(IJ).EQ.24.) IEV(IJ) = 78
C109      IF(RR(IJ).EQ.25.) IEV(IJ) = 89
C110      IF(RR(IJ).EQ.26.) IEV(IJ) = 103
C111      IF(RR(IJ).EQ.27.) IEV(IJ) = 118
C112      IF(RR(IJ).EQ.28.) IEV(IJ) = 136
C113      IF(RR(IJ).EQ.29.) IEV(IJ) = 162
C114      IF(RR(IJ).EQ.30.) IEV(IJ) = 204
C115      30 CONTINUE
C116      DO 31IK = 1,15
C117      31 ISUMT1 = ISUMT1+IEV(IK)
C118      DO 32IN = 16,30
C119      32 ISUMT2 = ISUMT2+IEV(IN)
C120      IF(ISUMT1.LT.ISUMT2) GO TO 33
C121      I11 = ISUMT2
C122      GO TO 34

```

```

0123      32 IT1 = ISUMT1
0124      34 T1 = IT1/100.
0125      DO 35KK = 1,30
0126      EV(KK) = 1E*(KK)/100.
0127      35 EXPP = EXP+EV(KK)**2
0128      VARI = N1*N2/(N1+N2-1.)*(EXPP/(N1+N2))
0129      TER = 1/SQRT(VARI)
0130      ZTER = ABS(TER)
0131      IF(ZTER.GE.1.96) CTERO5 = CTERO5+1
0132      IF(ZTER.GE.2.58) CTERO1 = CTERO1+1
-----VAN DER WAERDEN-----
0133      DO 50JJ = 1,30
0134      IF(RR(JJ).EQ.1.) IZ1(JJ) = -135
0135      IF(RR(JJ).EQ.2.) IZ1(JJ) = -152
0136      IF(RR(JJ).EQ.3.) IZ1(JJ) = -130
0137      IF(RR(JJ).EQ.4.) IZ1(JJ) = -112
0138      IF(RR(JJ).EQ.5.) IZ1(JJ) = -95
0139      IF(RR(JJ).EQ.6.) IZ1(JJ) = -86
0140      IF(RR(JJ).EQ.7.) IZ1(JJ) = -75
0141      IF(RR(JJ).EQ.8.) IZ1(JJ) = -65
0142      IF(RR(JJ).EQ.9.) IZ1(JJ) = -55
0143      IF(RR(JJ).EQ.10.) IZ1(JJ) = -46
0144      IF(RR(JJ).EQ.11.) IZ1(JJ) = -37
0145      IF(RR(JJ).EQ.12.) IZ1(JJ) = -28
0146      IF(RR(JJ).EQ.13.) IZ1(JJ) = -20
0147      IF(RR(JJ).EQ.14.) IZ1(JJ) = -12
0148      IF(RR(JJ).EQ.15.) IZ1(JJ) = -4
0149      IF(RR(JJ).EQ.16.) IZ1(JJ) = 4
0150      IF(RR(JJ).EQ.17.) IZ1(JJ) = 12
0151      IF(RR(JJ).EQ.18.) IZ1(JJ) = 20
0152      IF(RR(JJ).EQ.19.) IZ1(JJ) = 28
0153      IF(RR(JJ).EQ.20.) IZ1(JJ) = 37
0154      IF(RR(JJ).EQ.21.) IZ1(JJ) = 46
0155      IF(RR(JJ).EQ.22.) IZ1(JJ) = 55
0156      IF(RR(JJ).EQ.23.) IZ1(JJ) = 65
0157      IF(RR(JJ).EQ.24.) IZ1(JJ) = 75
0158      IF(RR(JJ).EQ.25.) IZ1(JJ) = 86
0159      IF(RR(JJ).EQ.26.) IZ1(JJ) = 95
0160      IF(RR(JJ).EQ.27.) IZ1(JJ) = 112
0161      IF(RR(JJ).EQ.28.) IZ1(JJ) = 130
0162      IF(RR(JJ).EQ.29.) IZ1(JJ) = 152
0163      IF(RR(JJ).EQ.30.) IZ1(JJ) = 185
0164      50 CONTINUE
0165      DO 51LL = 1,15
0166      51 ISUMV1 = ISUMV1+IZ1(LL)
0167      DO 52MM = 1,30
0168      52 ISUMV2 = ISUMV2+IZ1(MM)
0169      IF(ISUMV1.LT.ISUMV2) GO TO 53
0170      ITV1 = ISUMV2
0171      GO TO 54
0172      53 ITV1 = ISUMV1
0173      54 TV1 = ITV1/100.
0174      DO 55NN = 1,30
0175      Z1(NN) = IZ1(NN)/100.
0176      55 Z11 = Z11+Z1(NN)**2/(N1+N2)
0177      VARV = N1*N2/(N1+N2-1.)*Z11
0178      VAN = TV1/SQRT(VARV)
0179      ZVAN = ABS(VAN)
0180      IF(ZVAN.GE.1.96) CVANO5 = CVANO5+1
0181      IF(ZVAN.GE.2.58) CVANO1 = CVANO1+1
0182      100 CONTINUE
0183      WRITE(3,200)
0184      200 FORMAT(/,5X,'CTT05',5X,'CWIN05',5X,'CTER05',5X,'LVANO5')
0185      WRITE(3,300)CTI05,CWIN05,CTER05,CVANO5
0186      300 FORMAT(3X,F6.1,4X,F6.1,5X,F6.1,5X,F6.1)
0187      WRITE(3,400)
0188      400 FORMAT(/,5X,'CTT01',5X,'CWIN01',5X,'CTER01',5X,'LVANO1')
0189      WRITE(3,500)CTI01,CWIN01,CTER01,CVANO1
0190      500 FORMAT(5X,F6.1,4X,F6.1,5X,F6.1,5X,F6.1)
0191      2000 CONTINUE
0192      STOP
0193      END

```

DCS FCIRAN IV 369N-FO-479 3-8 MAINPGM DATE 17/03/83 TIME 02.04.13

```
C/-----RANDOM-----/
00C1      SUBROUTINE RANDCM(IX,IY,RN)
00C2      COMMON IA
00C3      IY = IX*465539
00C4      IF(IY)5,6,6
00C5      5 IY = IY+2147483647+1
00C6      6 RN = IY
00C7      RN = RN*.4656613E-9
00C8      IX = IY
00C9      IA = IX
00J0      RETURN
00I1      END
```



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DOS FORTRAN IV 360N-FD-479 3-8

MAINPGM

DATE 15/03/83

TIME

23.15.39

0001
0002
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```
C / ----- LOGISTIC -----  
SUBROUTINE LOGIS(EX,STD,G)  
COMMON IA  
1 CALL RANDOM(IA,IY,RN)  
IF(RN.LE.0.0)GO TO 1  
XL = ALOG(RN)-ALOG(1.0-RN)  
XL = XL*SQRT(3.0)/3.141593  
G = EX+STD*XL  
RETURN  
END
```



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DCS FORTRAN IV 362N-FD-479 2-9

MAINPGM

DATE 12/03/83

TIME

12.17.11

```

C/-----RANK-----
0001      SUBROUTINE RANK(A,R,N)
0002      DIMENSION A(30),R(30)
0003      DO 10I = 1,N
0004      10 R(I) = 0.0
0005      DO 100J = 1,N
0006      IF(R(I))20,20,100
0007      20 SMALL = 0.0
0008      EQUAL = 0.0
0009      X = A(I)
0010      DO 50J = 1,N
0011      IF(A(J)-X)30,40,50
0012      30 SMALL = SMALL+1.0
0013      GO TO 50
0014      40 EQUAL = EQUAL+1.0
0015      R(J) = -1.0
0016      50 CONTINUE
0017      IF(EQUAL-1.0)60,60,70
0018      60 R(I) = SMALL+1.0
0019      GO TO 100
0020      70 P = SMALL+(EQUAL+1.0)*0.5
0021      DO 90J = 1,N
0022      IF(R(J)+1.0)90,80,90
0023      80 R(J) = P
0024      90 CONTINUE
0025      100 CONTINUE
0026      RETURN
0027      END

```

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ประวัติผู้เขียน

นางสาวไพบรมา พจนพิมล เกิดวันที่ 18 กรกฎาคม พ.ศ. 2498 ที่จังหวัดชุมพร สำเร็จการศึกษาปริญญาการศึกษบัณฑิต (เกียรตินิยมอันดับ 2) วิชา เอกคณิตศาสตร์ จาก มหาวิทยาลัยศรีนครินทรวิโรฒ วิทยาเขตบางแสน เมื่อปีการศึกษา 2520 เข้าศึกษาต่อใน สาขาวิชา สถิติการศึกษา ภาควิชาวิจัยการศึกษา บัณฑิตวิทยาลัย จุฬาลงกรณ์มหาวิทยาลัย ปีการศึกษา 2524 ปัจจุบันรับราชการตำแหน่งอาจารย์ 1 ระดับ 3 โรงเรียนสวนศรีวิทยา อ.หลังสวน จ.ชุมพร



ศูนย์วิทยบริการ
จุฬาลงกรณ์มหาวิทยาลัย