รายการอ้างอิง

ภาษาไทย

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ภาคผนวก ก

โปรแกรมที่ใช้ในการทดสอบเปรียบเทียบตัวสถิติทดสอบ   สำหรับการทดสอบ
สมมติฐานเกี่ยวกับค่าเฉลี่ย เมื่อประชากรมีการแจกแจงต่าง ๆ ดังนี้

1. การประมาณการแจกแจงของตัวสถิติทดสอบ เมื่อประชากรมีการแจกแจง
แลมดาของตูกีร์

1.1 โปรแกรมหลักสำหรับการแจกแจงแลมดาของตูกีร์

1.2 โปรแกรมฟังก์ชันสำหรับการแจกแจงแลมดาของตูกีร์

2. การประมาณการแจกแจงของตัวสถิติทดสอบ เมื่อประชากรมีการแจกแจง
ปกติ

2.1 โปรแกรมหลักสำหรับการแจกแจงปกติ

2.2 โปรแกรมฟังก์ชันสำหรับการแจกแจงปกติ

3. การประมาณการแจกแจงของตัวสถิติทดสอบ เมื่อประชากรมีการแจกแจง
แกมมา

3.1 โปรแกรมหลักสำหรับการแจกแจงแกมมา

3.2 โปรแกรมฟังก์ชันสำหรับการแจกแจงแกมมา

4. การประมาณการแจกแจงของตัวสถิติทดสอบ เมื่อประชากรมีการแจกแจง
ลอกนอร์มอล

4.1 โปรแกรมหลักสำหรับการแจกแจงลอกนอร์มอล

4.2 โปรแกรมฟังก์ชันสำหรับการแจกแจงลอกนอร์มอล

5. โปรแกรมสำหรับการทดสอบตัวสถิติ

1. การประมาณการแจกแจงของตัวสถิติทดสอบ เมื่อประชากรมีการแจกแจงแลมดาของตูกีร์

1.1 โปรแกรมหลักสำหรับการแจกแจงแลมดาของตูกีร์

```
C *********************************************************************
C *          A COMPARISON ON TEST STATISTICS FOR TESTING         *
C *             THE DIFFERENT AMONG POPULATION MEANS             *
C *********************************************************************
      DIMENSION X(5,100),XBAR(5),S2(5),N(5),SUMX(5),SUMXX(5)
      DIMENSION Z(500),R(5,100),SR(5),SR2(5),ABARI(5),SMX2(5),SUMAI(5)
      COMMON /SEED/IX
      REAL LAM1,LAM2,LAM3,LAM4,LAM5,KW,NS,IQR,LAM
      DATA K,N(1),N(2),N(3),N(4),N(5)/3,5,5,5,5,5/
      DATA FT01,FT05,FT10/6.93,3.89,2.81/
      DATA KW01,KW05,KW10/9.2,6.0,4.6/
      DATA NS01,NS05,NS10/9.2,6.0,4.6/
      DATA CA01,CA05,CA10/9.2,6.0,4.6/
      DATA AM1,AM2,AM3,AM4/0.0,0.5774,1.000,1.000/
      DATA DM1,DM2,DM3,DM4,DM5/1.0,1.0,1.0,1.0,1.0/
      DATA SG1,SG2,SG3,SG4,SG5/1.0,1.0,1.0,1.0,1.0/
      ROUND = 1000
      IX = 973253
      DO 500 L = 1,ROUND
      WRITE (6,1)
    1 FORMAT (10X,'*-------LAMDA DIST-------*')
      DO 12 I = 1,K
      DO 11 J = 1,N(I)
      IF (I.EQ.1) THEN
          X(1,J) = LAM1(AM1,AM2,AM3,AM4,DM1,SG1)
      ELSE
          IF (I.EQ.2) THEN
              X(2,J) = LAM2(AM1,AM2,AM3,AM4,DM2,SG2)
          ELSE
              IF (I.EQ.3) THEN
                  X(3,J) = LAM3(AM1,AM2,AM3,AM4,DM3,SG3)
              ELSE
                  IF (I.EQ.4) THEN
```

```
        X(4,J) = LAM4(AM1,AM2,AM3,AM4,DM4,SG4)
      ELSE
        X(5,J) = LAM5(AM1,AM2,AM3,AM4,DM5,SG5)
      ENDIF
    ENDIF
  ENDIF
 ENDIF
11 CONTINUE
12 CONTINUE
```

1.2 โปรแกรมฟังก์ชันสำหรับการแจกแจงแลมดาของตูกีร์

```
C ************************************************************************
C *          FUNCTION LAM(A1,A2,A3,A4,DM1,SG1) DISTRIBUTION          *
C ************************************************************************
      FUNCTION LAM1(AM1,AM2,AM3,AM4,DM1,SG1)
      REAL LAM1
      COMMON /SEED/IX
      A1 = AM1*SQRT(SG1)+DM1
      A2 = AM2/SQRT(SG1)
      CALL RAND(IX,RD)
      LAM1 = A1+(RD**AM3-(1-RD)**AM4)/A2
      RETURN
      END
```

2. การประมาณการแจกแจงของตัวสถิติทดสอบ เมื่อประชากรมีการแจกแจงปกติ
2.1 โปรแกรมหลักสำหรับการแจกแจงปกติ

```
      DIMENSION X(5,100),XBAR(5),S2(5),N(5),SUMX(5),SUMXX(5)
      DIMENSION Z(500),R(5,100),SR(5),SR2(5),ABARI(5),SMX2(5),SUMAI(5)
      COMMON /SEED/IX
      REAL NORM1,NORM2,NORM3,NORM4,NORM5,KW,NS,IQR
      DATA K,N(1),N(2),N(3),N(4),N(5)/3,5,5,5,5,5/
      DATA FT01,FT05,FT10/6.93,3.89,2.81/
      DATA KW01,KW05,KW10/9.2,6.0,4.6/
      DATA NS01,NS05,NS10/9.2,6.0,4.6/
      DATA CA01,CA05,CA10/9.2,6.0,4.6/
```

```
DATA DM1,DM2,DM3,DM4,DM5/100.0,100.0,100.0,100.0,100.0/
DATA SG1,SG2,SG3,SG4,SG5/100.0,100.0,100.0,100.0,100.0/
ROUND = 1000
IX = 973253
DO 500 L = 1,ROUND
WRITE (6,1)
1 FORMAT (10X,'*-------NORMAL DIST-------*')
DO 12 I = 1,K
DO 11 J = 1,N(I)
IF (I.EQ.1) THEN
   X(1,J) = NORM1(DM1,SG1)
ELSE
   IF (I.EQ.2) THEN
      X(2,J) = NORM2(DM2,SG2)
   ELSE
      IF (I.EQ.3) THEN
         X(3,J) = NORM3(DM3,SG3)
      ELSE
         IF (I.EQ.4) THEN
            X(4,J) = NORM4(DM4,SG4)
         ELSE
            X(5,J) = NORM5(DM5,SG5)
         ENDIF
      ENDIF
   ENDIF
ENDIF
11 CONTINUE
12 CONTINUE
```

2.2 โปรแกรมฟังก์ชันสำหรับการแจกแจงปกติ

```
C ****************************************************************************
C *            FUNCTION NORMAL (DMEAN,SIGMA) DISTRIBUTION                  *
C ****************************************************************************
FUNCTION NORM1(DM1,SG1)
REAL NORM1
```

```
COMMON /SEED/IX
PI = 3.1415926
CALL RAND(IX,RD)
Z1 = SQRT(-2*ALOG(RD))*COS(2*PI*RD)
NORM1 = Z1*SG1+DM1
RETURN
END
```

3. การประมาณการแจกแจงของตัวสถิติทดสอบ เมื่อประชากรมีการแจกแจงแกมมา

3.1 โปรแกรมหลักสำหรับการแจกแจงแกมมา

```
DIMENSION X(5,100),XBAR(5),S2(5),N(5),SUMX(5),SUMXX(5)
DIMENSION Z(500),R(5,100),SR(5),SR2(5),ABARI(5),SMX2(5),SUMAI(5)
COMMON /SEED/IX
REAL GAMMA1,GAMMA2,GAMMA3,GAMMA4,GAMMA5,KW,NS,IQR
DATA K,N(1),N(2),N(3),N(4),N(5)/3,5,5,5,5,5/
DATA FT01,FT05,FT10/6.93,3.89,2.81/
DATA KW01,KW05,KW10/9.2,6.0,4.6/
DATA NS01,NS05,NS10/9.2,6.0,4.6/
DATA CA01,CA05,CA10/9.2,6.0,4.6/
DATA ALPHA1,ALPHA2,ALPHA3,ALPHA4,ALPHA5/1.0,1.0,2.25,1.0,1.0/
DATA BETA1,BETA2,BETA3,BETA4,BETA5/1.0,1.0,1.5,1.0,1.0/
ROUND = 1000
IX = 973253
DO 500 L = 1,ROUND
WRITE (6,1)
1 FORMAT (10X,'*-------GAMMA DISTRIBUTION-------*')
DO 12 I = 1,K
DO 11 J = 1,N(I)
IF (I.EQ.1) THEN
    X(1,J) = GAMMA1(ALPHA1,BETA1)
ELSE
    IF (I.EQ.2) THEN
        X(2,J) = GAMMA2(ALPHA2,BETA2)
    ELSE
        IF (I.EQ.3) THEN
```

```
        X(3,J) = GAMMA3(ALPHA3,BETA3)
    ELSE
      IF (I.EQ.4) THEN
          X(4,J) = GAMMA4(ALPHA4,BETA4)
      ELSE
          X(5,J) = GAMMA5(ALPHA5,BETA5)
      ENDIF
    ENDIF
   ENDIF
  ENDIF
11 CONTINUE
12 CONTINUE
```

3.2 โปรแกรมฟังก์ชันสำหรับการแจกแจงแกมมา

```
C ********************************************************************************
C *                    FUNCTION GAMMA  DISTRIBUTION                             *
C ********************************************************************************
    FUNCTION GAMMA1(ALPHA1,GAM1)
    COMMON /SEED/IX
    A = SQRT(2*ALPHA1-1)
    B = 2*ALPHA1-(2*ALOG(2))+1/A
21 CALL RAND(IX,R1)
    CALL RAND(IX,R2)
    X  = ALPHA1*(R1/(1-R1))**A
    XB = B-ALOG((R1**2)*R2)
    IF (X.GT.XB) GOTO 21
    GAMMA1 = X/GAM1
    RETURN
    END
```

4. การประมาณการแจกแจงของตัวสถิติทดสอบ เมื่อประชากรมีการแจกแจงลอกนอร์มอล

4.1 โปรแกรมหลักสำหรับการแจกแจงลอกนอร์มอล

```
    DIMENSION X(5,100),XBAR(5),S2(5),N(5),SUMX(5),SUMXX(5)
    DIMENSION Z(500),R(5,100),SR(5),SR2(5),ABARI(5),SMX2(5),SUMAI(5)
    COMMON /SEED/IX
```

```
REAL NORM1,NORM2,NORM3,NORM4,NORM5,KW,NS,IQR
DATA K,N(1),N(2),N(3),N(4),N(5)/3,5,5,5,5,5/
DATA FT01,FT05,FT10/6.93,3.89,2.81/
DATA KW01,KW05,KW10/9.2,6.0,4.6/
DATA NS01,NS05,NS10/9.2,6.0,4.6/
DATA CA01,CA05,CA10/9.2,6.0,4.6/
DATA DM1,DM2,DM3,DM4,DM5/-0.698,-0.698,-0.698,-0.698,-0.698/
DATA SG1,SG2,SG3,SG4,SG5/0.01,0.01,0.01,0.01,0.01/
ROUND = 1000
IX = 973253
 DO 500 L = 1,ROUND
WRITE (6,1)
1 FORMAT (10X,'*-------LOGNORMAL DIST------*')
DO 12 I = 1,K
DO 11 J = 1,N(I)
IF (I.EQ.1) THEN
   X(1,J) = EXP(NORM1(DM1,SG1))
ELSE
   IF (I.EQ.2) THEN
      X(2,J) = EXP(NORM2(DM2,SG2))
   ELSE
      IF (I.EQ.3) THEN
         X(3,J) = EXP(NORM3(DM3,SG3))
      ELSE
         IF (I.EQ.4) THEN
            X(4,J) = EXP(NORM4(DM4,SG4))
         ELSE
            X(5,J) = EXP(NORM5(DM5,SG5))
         ENDIF
      ENDIF
   ENDIF
ENDIF
11 CONTINUE
12 CONTINUE
```

4.2 โปรแกรมฟังก์ชันสำหรับการแจกแจงลอกนอร์มอล

อาศัยฟังก์ชันการแจกแจงปกติ

5. โปรแกรมหลักที่ใช้คำนวณค่าสถิติทดสอบทั้ง วิธี

โปรแกรมคำนวณตัวสถิติทดสอบเอฟ

```
C ********************************************************************************
C *                    COMPUTE TEST STATISTIC : F-TEST                          *
C ********************************************************************************
      WRITE (6,111)
  111 FORMAT(10X,'*------ F-TEST ------*')
      SUMNX = 0.0
      DO 113 I = 1,K
        SUMX(I) = 0.0
        SUMXX(I) = 0.0
      DO 115 J = 1,N(I)
      IF (I.EQ.1) THEN
          X(I,J) = X(1,J)
      ELSE
        IF (I.EQ.2) THEN
            X(I,J) = X(2,J)
        ELSE  IF (I.EQ.3) THEN
            X(I,J) = X(3,J)
          ELSE  IF (I.EQ.4) THEN
              X(I,J) = X(4,J)
            ELSE  X(I,J) = X(5,J)
          ENDIF
        ENDIF
      ENDIF
      SUMX(I) = SUMX(I) + X(I,J)
      SUMXX(I) = SUMXX(I) + (X(I,J)**2)
  115 CONTINUE
      XBAR(I) = SUMX(I)/N(I)
      SUMNX = SUMNX + (N(I)*XBAR(I))
      S2(I) = (SUMXX(I)-N(I)*XBAR(I)**2)/(N(I)-1)
```

```
113 CONTINUE
     XBARR = SUMNX/NN
     SSR = 0.0
     SSE = 0.0
     DO 118 I = 1,K
       SSR = SSR + N(I)*(XBAR(I)-XBARR)**2
       SSE = SSE + (N(I)-1)*S2(I)
118 CONTINUE
     FT = (SSR/(K-1))/(SSE/(NN-K))
     IF (FT.GE.FT01) F01 = F01 + 1
     IF (FT.GE.FT05) F05 = F05 + !
     IF (FT.GE.FT10) F10 = F10 + 1
```

โปรแกรมคำนวณตัวสถิติทดสอบครัสคัล-วัลลิส

```
C ***********************************************************************
C *            COMPUTE TEST STATISTIC : KRUSKALL-WALLIS              *
C ***********************************************************************
     WRITE (6,60)
  60 FORMAT(10X,'*------ KRUSKALL-WALLIS TEST ------*'/)
     IN = 1
     DO 140 I = 1,K
     DO 141 J = 1,N(I)
     Z(IN) = X(I,J)
     IN = IN + 1
141 CONTINUE
140 CONTINUE
     CALL RANK(NN,Z)
     DO 143 I = 1,K
     DO 144 J = 1,N(I)
     DO 145 M = 1,NN
     IF (X(I,J).NE.Z(M)) GOTO 145
       R(I,J) = M
     GOTO 144
145 CONTINUE
144 CONTINUE
```

```
143 CONTINUE
    DO 147 I = 1,K
    SR(I) = 0.0
    DO 148 J = 1,N(I)
    SR(I) = SR(I) + R(I,J)
148 CONTINUE
147 CONTINUE
    SRK = 0.0
    DO 150 I = 1,K
    SR2(I) = (SR(I)**2)/N(I)
    SRK = SRK + SR2(I)
150 CONTINUE

    KW = ((12.0/(NN*(NN+1.)))*SRK)-3.*(NN+1.)
    IF (KW.GE.KW01) K01 = K01 + 1
    IF (KW.GE.KW05) K05 = K05 + 1
    IF (KW.GE.KW10) K10 = K10 + 1
```

โปรแกรมคำนวณตัวสถิติทดสอบนอร์มัลสกอร์

```
C ****************************************************************************
C *              COMPUTE TEST STATISTIC : NORMAL SCORES                    *
C ****************************************************************************
    WRITE (6,70)
 70 FORMAT(10X,'*------ NORMAL SCORES TEST ------*'/)
    SMX = 0.0
    SIG = 1.0
    DO 71 II = 1,NN
    CALL INV(II,NN,SIG,ROUND,X1)
    X11 = X1*X1
    SMX = SMX+X11
 71 CONTINUE
    SMY = 0.0
    SMX2(1) = 0.0
    DO 72 I = 1,K
    SMX2(I) = 0.0
```

```
    DO 73 J =1,N(I)

    II = R(I,J)

    CALL INV(II,NN,SIG,ROUND,X1)

    SMX2(I) = SMX2(I) + X1

73 CONTINUE

    SMY = SMY + (SMX2(I)**2/N(I))

72 CONTINUE


    NS = ((NN-1.0)/SMX)*SMY

    IF (NS.GE.NS01) N01 = N01 + 1

    IF (NS.GE.NS05) N05 = N05 + 1

    IF (NS.GE.NS10) N10 = N10 + 1
```

โปรแกรมคำนวณตัวสถิติทดสอบแบบตัดแปลงอย่างต่อเนื่อง

```
C ************************************************************************

C *              COMPUTE TEST STATISTIC : ADAPTIVE TEST                 *

C ************************************************************************

    WRITE (6,80)

80 FORMAT(10X,'*------ ADAPTIVE TEST ------*'/)

    IA = 1

    DO 81 I = 1,K

    DO 82 J = 1,N(I)

    Z(IA) = X(I,J)

    IA = IA + 1

82 CONTINUE

81 CONTINUE

    CALL RANK (NN,Z)

C ********************* COMPUTE PERCENTILE ********************* C

    XP5  = 0.05*(NN+1)

    XP25 = 0.25*(NN+1)

    XP75 = 0.75*(NN+1)

    XP95 = 0.95*(NN+1)

    IP5 = XP5

    AP5 = XP5-IP5

    IP25 = XP25
```

```
AP25 = XP25-IP25

IP75 = XP75

AP75 = XP75-IP75

IP95 = XP95

AP95 = XP95-IP95

Z(0) = 0

P5 = 0.05*Z(IP5) + AP5*Z(IP5+1)

P25 = 0.25*Z(IP25) + AP25*Z(IP25+1)

P75 = 0.75*Z(IP75) + AP75*Z(IP75+1)

P95 = 0.95*Z(IP95) + AP95*Z(IP95+1)

IQR = P75 - P25

TL = (P25-P5)/IQR

TR = (P95-P75)/IQR

IF (TL.LT.0.4) THEN

     TLX = 0.4

ELSE

    TLX = TL

ENDIF

IF (TR.LT.0.4) THEN

    TRX = 0.4

ELSE

    TRX = TR

ENDIF

UL = (NN+1.)/4.0

UU = 3*(NN+1.)/4.0

SUMA = 0.0

SUMAI = 0.0

DO 85 I = 1,K

DO 86 J = 1,N(I)

IF (R(I,J).LT.UL) THEN

   ACA = UL + (0.8401/TLX)**2*(R(I,J)-UL)

ELSE

   IF (R(I,J).GT.UU) THEN

        ACA = UU + (0.8401/TRX)**2*(R(I,J)-UU)

   ELSE
```

```
               ACA = R(I,J)
          ENDIF
      ENDIF
      SUMA = SUMA + ACA
      SUMAI(I) = SUMAI(I) +ACA
86 CONTINUE
      ABARI(I) = SUMAI(I)/N(I)
85 CONTINUE
      ABAR₁= SUMA/NN
      SUMUA = 0.0
      DO 88 I = 1,K
      SUMUA = SUMUA + N(I)*(ABARI(I) - ABAR)**2
88 CONTINUE
      SUMLA = 0.0
      DO 90 I = 1,K
      DO 91 J = 1,N(I)
      IF (R(I,J).LT.UL) THEN
          ACA = UL + (0.8401/TLX)**2*(R(I,J)-UL)
      ELSE
          IF (R(I,J).GT.UU) THEN
             ACA = UU + (0.8401/TRX)**2*(R(I,J)-UU)
          ELSE
             ACA = R(I,J)
          ENDIF
      ENDIF
      SUMLA = SUMLA + ((ACA-ABAR)**2)
      SUML = SUMLA/(NN-1.0)
91 CONTINUE
90 CONTINUE
      CA = SUMUA/SUML
      IF (CA.GE.CA01) C01 = C01 + 1
      IF (CA.GE.CA05) C05 = C05 + 1
      IF (CA.GE.CA10) C10 = C10 + 1
500 CONTINUE
```

โปรแกรมคำนวณความคลาดเคลื่อนประเภทที่ 1 และค่าอำนาจการทดสอบ

```
C *************************************************************************
C *              COMPUTE TYPE I ERROR AND POWER OF TEST                  *
C *************************************************************************
      PFT01 = F01/FLOAT(ROUND)
      PFT05 = F05/FLOAT(ROUND)
      PFT10 = F10/FLOAT(ROUND)
      PKW01 = K01/FLOAT(ROUND)
      PKW05 = K05/FLOAT(ROUND)
      PKW10 = K10/FLOAT(ROUND)
      PNS01 = N01/FLOAT(ROUND)
      PNS05 = N05/FLOAT(ROUND)
      PNS10 = N10/FLOAT(ROUND)
      PCA01 = C01/FLOAT(ROUND)
      PCA05 = C05/FLOAT(ROUND)
      PCA10 = C10/FLOAT(ROUND)
      WRITE (6,501) PFT01,PFT05,PFT10
  501 FORMAT(/1X,'PFT01 = ',F8.4,5X,'PFT05 = ',F8.4,5X,'PFT10 = ',F8.4)
      WRITE (6,502) PKW01,PKW05,PKW10
  502 FORMAT(/1X,'PKW01 = ',F8.4,5X,'PKW05 = ',F8.4,5X,'PKW10 = ',F8.4)
      WRITE (6,503) PNS01,PNS05,PNS10
  503 FORMAT(/1X,'PNS01 = ',F8.4,5X,'PNS05 = ',F8.4,5X,'PNS10 = ',F8.4)
      WRITE (6,504) PCA01,PCA05,PCA10
  504 FORMAT(/1X,'PCA01 = ',F8.4,5X,'PCA05 = ',F8.4,5X,'PCA10 = ',F8.4)
```

โปรแกรมย่อยสร้างตัวแปรสุ่ม

```
C *************************************************************************
C *                SUBROUTINE RANDOM VARIABLE                            *
C *************************************************************************
      SUBROUTINE RAND(IX,RD)
      IX = IX*16807
      IF(IX.LT.0) IX = IX+2147483647+1
      RD = IX*0.465661E-9
      RETURN
      END
```

โปรแกรมย่อยเรียงลำดับข้อมูล

```
C ************************************************************************
C *              SUBROUTINE FOR RANKING OBSERVATION                     *
C ************************************************************************
      SUBROUTINE RANK(NN,Z)
      DIMENSION Z(500)
      N1 = NN-1
      DO 10 IR = 1,N1
        II = IR+1
      DO 10 R = II,NN
        IF (Z(IR).LE.Z(R)) GOTO 10
           T = Z(IR)
         Z(IR) = Z(R)
         Z(R) = T
   10 CONTINUE
      DO 45 M = 1,NN
   45 CONTINUE
      RETURN
      END
```

โปรแกรมย่อยสร้างฟังก์ชันปกติสะสม

```
C ************************************************************************
C *              SUBROUTINE FOR FIND CMUN FUNCTION                      *
C ************************************************************************
      SUBROUTINE CMUN(X0,P)
      DIMENSION A(6)
      A(1) = 0.0705230784
      A(2) = 0.0422820123
      A(3) = 0.0092705272
      A(4) = 0.0001520143
      A(5) = 0.0002765672
      A(6) = 0.0000430638
      SUM = 0.0
      DO 1 IC = 1,6
      SUM = SUM + A(IC)*(ABS(X0)/SQRT(2))**IC
```

```
1 CONTINUE
    B = 1 + SUM
    F = B**(-16)
    IF (X0.LE.0) THEN
        P = F/2
    ELSE
        P = 1-F/2
    ENDIF
    RETURN
    END
```

โปรแกรมย่อยสร้างอินเวอร์สฟังก์ชัน

```
C **********************************************************************
C *              SUBROUTINE FOR FIND INVERSE FUNCTION                 *
C **********************************************************************
    SUBROUTINE INV(II,NN,SIG,ROUND,X1)
    P1 = II/(NN+1.0)
    NC = 1.0
    X0 = 0.0
5 DE = (1.0/(SIG*2.506628))*(2.718282**(-(X0*X0/2.0)))
    CALL CMUN(X0,P)
    X1 = X0-(P-P1)/DE
    Y = ABS(X1-X0)
    IF (Y.LE.0.001) GOTO 10
        X0 = X1
    IF (NC.GT.ROUND) STOP
        NC = NC + 1
    GOTO 5
10 RETURN
    END
```

ภาคผนวก ข

นิวตัน-ราฟสัน (Newton-Raphson Method)

วิธีนิวตัน-ราฟสัน หรือเรียกสั้นๆ ว่าวิธีการของนิวตัน เป็นวิธีที่มีประสิทธิภาพสูง
มากและใช้กันมาก วิธีนี้มีสูตรการทำซ้ำหรือสูตรเวียนบังเกิด สำหรับคำนวณหาค่ารากของสม
การดังนี้

$$x_i = x_{i-1} - \frac{f(x_{i-1})}{f'(x_{i-1})}, \qquad i = 1,2,...$$

ฉะนั้น วิธีนี้นอกจากจะต้องกำหนดรากเริ่มต้นแล้ว จะต้องหาฟังก์ชัน f' ด้วย
ดังขั้นตอนต่อไปนี้

1. กำหนดค่า x เริ่มต้นให้เป็น x_0

2. คำนวณค่า $\quad p = (\frac{i}{N+1}) = \Phi(x)$

$$= \int_{-\infty}^{x} \frac{1}{\sigma\sqrt{2\pi}} e^{\frac{-y^2}{2}} dy$$

เมื่อ x มีการแจกแจงปกติ อาจประมาณค่า p ได้เป็น

$$p = 0.5 + \int_{0}^{x} \frac{1}{\sigma\sqrt{2\pi}} dy$$

และสามารถเขียน x ให้อยู่ในรูป

$$x = \Phi^{-1}\left(\frac{i}{N+1}\right) \qquad x_2 = \Phi^{-1}\left(\frac{R_i}{N+1}\right)$$

จะได้ว่า $\qquad f(x) = \Phi(x) - \frac{i}{N+1} = 0$

$$f(x_0) = \int_{-\infty}^{x_0} \frac{1}{\sigma\sqrt{2\pi}} e^{\frac{-y^2}{2}} dy - \frac{i}{N+1} = 0$$

3. คำนวณค่า $f'(x_0)$

$$f'(x_0) = \frac{1}{\sigma\sqrt{2\pi}} e^{\frac{-x_0^2}{2}}$$

4. คำนวณค่า $f(x_0)$ จากนั้นทำการแทนค่าที่คำนวณมาได้ลงในสมการข้าง
ล่าง จะได้ค่าของ x ในรอบแรก นั่นคือ

$$x = x_0 - \frac{f(x_0)}{f'(x_0)}$$

5. คำนวณค่า $y = |x - x_0|$ ถ้า $y \leq 0.001$ ผลลัพธ์ที่ได้ คือ $x = x_0$ แต่ถ้า
$y > 0.001$ แล้ว จะย้อนกลับไปทำงานตามขั้นตอนที่ 3

ดังนั้นการคำนวณค่าอินเวิร์สฟังก์ชันสามารถเขียนให้อยู่ในรูปโปรแกรมย่อย
SUBROUTINE INV(II,NN,SIG,ROUND,X1) ดังในภาคผนวก ก.

วิธีการคำนวณค่า $\Phi(x)$

จาก $\quad \Phi(x) = \int_{-\infty}^{x} \frac{1}{\sigma\sqrt{2\pi}} e^{\frac{-y^2}{2}} \, dy$

จะได้ว่า

$$B = 1 + \sum_{i=1}^{6} A_i \left(\frac{|x|}{\sqrt{2}}\right)^i$$

$$F = B^{-16}$$

นั่นคือ $\qquad \Phi(x) = \begin{cases} \dfrac{F}{2} & \text{ถ้า} \quad x \leq 0 \\ 1 - \dfrac{F}{2} & \text{ถ้า} \quad x > 0 \end{cases}$

โดยที่ $\quad A_1 = 0.0705230784$

$\qquad A_2 = 0.0422820123$

$\qquad A_3 = 0.0092705272$

$\qquad A_4 = 0.0001520143$

$\qquad A_5 = 0.0002765672$

$\qquad A_6 = 0.0000430638$

ซึ่งวิธีการคำนวณค่า $\Phi(x)$ ผู้วิจัยได้เขียนให้อยู่ในรูปของโปรแกรมย่อย
SUBROUTINE CMUN(X0,P) ภาคผนวก ก.

ภาคผนวก ก.

ตารางที่ ก.   ตาราง RAMBERG   กำหนดพารามิเตอร์แลมดาของการแจกแจงแลมดาของตูกีร์

จำแนกตามความเบ้ α_3 และความโค่ง α_4 เมื่อ $\mu = 0.0$ และ $\sigma^2 = 1.0$

(หมายเหตุ: ตารางค่าตัวเลขด้านล่างมีคุณภาพของภาพต่ำมาก ตัวเลขส่วนใหญ่ไม่ชัดเจน ค่าที่แสดงเป็นการอ่านโดยประมาณเท่านั้น)

$\alpha_3 = 0.0$

α_4	LAM 1	LAM 2	LAM 3	LAM 4
1.8	.0	.5774	1.0000	1.0000
2.0	.0	.4952	.5883	.5883
2.2	.0	.4197	.4092	.4092
2.4	.0	.3533	.3032	.3032
2.6	.0	.2949	.2303	.2303
2.8	.0	.2433	.1765	.1765
3.0	.0	.1974	.1349	.1349
3.2	.0	.1563	.1016	.1016
3.4	.0	.1191	.0742	.0742
3.6	.0	.0852	.0512	.0512
3.8	.0	.0545	.0317	.0317
4.0	.0	.0252	.0148	.0148
4.1	.0	.0128	.7180+	.7180+
4.2	.0	−.0659+	−.0363+	−.0363+
4.3	.0	−.0123	−.6706+	−.6706+
4.4	.0	−.0201	−.0130	−.0130
4.6	.0	−.0466	−.0246	−.0246
4.8	.0	−.0676	−.0350	−.0350
5.0	.0	−.0870	−.0443	−.0443
5.2	.0	−.1053	−.0528	−.0528
5.4	.0	−.1227	−.0606	−.0606
5.6	.0	−.1389	−.0677	−.0677
5.8	.0	−.1541	−.0742	−.0742
6.0	.0	−.1686	−.0802	−.0802
6.2	.0	−.1823	−.0858	−.0858
6.4	.0	−.1954	−.0910	−.0910
6.6	.0	−.2077	−.0958	−.0958
6.8	.0	−.2194	−.1003	−.1003
7.0	.0	−.2306	−.1045	−.1045
7.2	.0	−.2414	−.1085	−.1085
7.4	.0	−.2518	−.1123	−.1123
7.6	.0	−.2615	−.1158	−.1158
7.8	.0	−.2709	−.1191	−.1191
8.0	.0	−.2800	−.1223	−.1223
8.2	.0	−.2887	−.1253	−.1253
8.4	.0	−.2969	−.1281	−.1281
8.6	.0	−.3050	−.1308	−.1308
8.8	.0	−.3128	−.1334	−.1334
9.0	.0	−.3203	−.1359	−.1359

$\alpha_3 = 0.05$

α_4	LAM 1	LAM 2	LAM 3	LAM 4
1.8	−1.703	.2861	.0000	.9502+
2.0	−1.229	.3122	.0505	.7603
2.2	−.802	.3334	.1128	.5802
2.4	−.575	.3328	.1676	.3941
2.6	−.343	.2929	.1973	.2605
2.8	−.083	.2429	.1625	.1903
3.0	−.059	.1975	.1276	.1429
3.2	−.046	.1565	.0974	.1061
3.4	−.018	.1194	.0718	.0770
3.6	−.033	.0856	.0499	.0530
3.8	−.027	.0548	.0311	.0327
4.0	−.026	.0264	.0146	.0153
4.1	−.024	.0132	.7184+	.7184+
4.2	−.024	.0704+	.0380+	.0397+
4.3	−.022	−.0120	−.6386+	−.6643+
4.4	−.022	−.0230	−.0126	−.0131
4.6	−.018	−.0462	−.0240	−.0248
4.8	−.015	−.0671	−.0342	−.0351
5.0	−.016	−.0867	−.0435	−.0446
5.2	−.016	−.1050	−.0519	−.0534
5.4	−.015	−.1222	−.0596	−.0612
5.6	−.014	−.1386	−.0667	−.0684
5.8	−.014	−.1530	−.0731	−.0750
6.0	−.013	−.1682	−.0791	−.0810
6.2	−.012	−.1820	−.0847	−.0866
6.4	−.012	−.1950	−.0899	−.0918
6.6	−.012	−.2074	−.0947	−.0967
6.8	−.011	−.2192	−.0992	−.1012
7.0	−.011	−.2303	−.1034	−.1054
7.2	−.010	−.2411	−.1074	−.1094
7.4	−.010	−.2515	−.1112	−.1132
7.6	−.379+	−.2613	−.1147	−.1167
7.8	−.999+	−.2707	−.1180	−.1201
8.0	−.928+	−.2797	−.1212	−.1232
8.2	−.906+	−.2884	−.1242	−.1262
8.4	−.531+	−.2968	−.1270	−.1291
8.6	−.912+	−.3048	−.1297	−.1316
8.8	−.852+	−.3125	−.1323	−.1343
9.0	−.837+	−.3201	−.1348	−.1368

$\alpha_3 = 0.10$

α_4	LAM 1	LAM 2	LAM 3	LAM 4
1.8	−1.678	.2835	.0000+	.9010
2.0	−1.271	.3028	.0412	.7373
2.2	−.872	.3177	.0941	.5700
2.4	−.515	.3164	.1477	.4116
2.6	−.263	.2943	.1678	.2831
2.8	−.168	.2417	.1486	.2033
3.0	−.117	.1977	.1205	.1502
3.2	−.092	.1572	.0936	.1111
3.4	−.076	.1203	.0698	.0803
3.6	−.045	.0866	.0490	.0552
3.8	−.057	.0558	.0306	.0342
4.0	−.065	.0276	.0149	.0163
4.1	−.048	.0742	.7606+	.8302+
4.2	−.046	.1460+	.0762+	.0826
4.3	−.044	−.0109	−.5703+	−.6174
4.4	−.041	−.0227	−.0118	−.0127
4.6	−.037	−.0452	−.0231	−.0247
4.8	−.034	−.0661	−.0332	−.0354
5.0	−.033	−.0857	−.0424	−.0450
5.2	−.032	−.1040	−.0507	−.0537
5.4	−.030	−.1213	−.0584	−.0616
5.6	−.028	−.1375	−.0654	−.0688
5.8	−.027	−.1530	−.0719	−.0755
6.0	−.027	−.1674	−.0778	−.0816
6.2	−.025	−.1811	−.0834	−.0872
6.4	−.024	−.1943	−.0886	−.0925
6.6	−.023	−.2066	−.0934	−.0973
6.8	−.023	−.2184	−.0979	−.1019
7.0	−.022	−.2297	−.1021	−.1062
7.2	−.021	−.2405	−.1061	−.1102
7.4	−.020	−.2507	−.1099	−.1139
7.6	−.020	−.2606	−.1134	−.1175
7.8	−.020	−.2699	−.1167	−.1208
8.0	−.019	−.2791	−.1199	−.1240
8.2	−.019	−.2876	−.1229	−.1270
8.4	−.018	−.2961	−.1258	−.1298
8.6	−.017	−.3041	−.1285	−.1323
8.8	−.017	−.3119	−.1311	−.1351
9.0	−.017	−.3193	−.1335	−.1376

$\alpha_3 = 0.15$

α_4	LAM 1	LAM 2	LAM 3	LAM 4
1.8	−1.655	.2811	.0000+	.8700+
2.0	−1.323	.2934	.0514	.7208
2.2	−.960	.3056	.0782	.5623
2.4	−.617	.3031	.1315	.4194
2.6	−.376	.2791	.1435	.2994
2.8	−.284	.2397	.1350	.2156
3.0	−.177	.1980	.1135	.1506
3.2	−.138	.1584	.0901	.1167
3.4	−.114	.1219	.0682	.0843
3.6	−.098	.0884	.0485	.0581
3.8	−.086	.0577	.0310	.0363
4.0	−.076	.0294	.0155	.0178
4.1	−.073	.0160	.0370+	.9564+
4.2	−.069	.3217+	.1667+	.1890+
4.3	−.066	−.5113+	−.4800+	−.5278+
4.4	−.063	−.0210	−.0107	−.0120
4.6	−.056	−.0435	−.0218	−.0242
4.8	−.055	−.0644	−.0318	−.0351
5.0	−.051	−.0842	−.0410	−.0449
5.2	−.048	−.1025	−.0493	−.0537
5.4	−.045	−.1198	−.0569	−.0617
5.6	−.043	−.1361	−.0639	−.0690
5.8	−.042	−.1514	−.0703	−.0757
6.0	−.040	−.1660	−.0763	−.0819
6.2	−.038	−.1798	−.0819	−.0876
6.4	−.037	−.1928	−.0870	−.0929
6.6	−.035	−.2053	−.0919	−.0978
6.8	−.034	−.2172	−.0964	−.1024
7.0	−.033	−.2284	−.1006	−.1067
7.2	−.032	−.2392	−.1046	−.1107
7.4	−.031	−.2496	−.1084	−.1145
7.6	−.030	−.2593	−.1119	−.1180
7.8	−.029	−.2686	−.1153	−.1214
8.0	−.028	−.2780	−.1185	−.1246
8.2	−.028	−.2866	−.1215	−.1276
8.4	−.027	−.2948	−.1243	−.1304
8.6	−.027	−.3031	−.1271	−.1332
8.8	−.026	−.3108	−.1297	−.1357
9.0	−.025	−.3183	−.1322	−.1382

$\alpha_3 = 0.20$

α_4	LAM 1	LAM 2	LAM 3	LAM 4
2.0	−1.387	.2841	.0212	.7090
2.2	−1.011	.2947	.0636	.5571
2.4	−.706	.2919	.1013	.4246
2.6	−.471	.2738	.1233	.3120
2.8	−.322	.2376	.1221	.2273
3.0	−.237	.1983	.1065	.1672
3.2	−.187	.1599	.0866	.1230
3.4	−.154	.1240	.0667	.0899
3.6	−.132	.0908	.0481	.0615
3.8	−.116	.0601	.0314	.0389
4.0	−.103	.0318	.0164	.0198
4.1	−.097	.0185	.9067+	.0113
4.2	−.093	.5707+	.2894+	.3429+
4.3	−.085	−.6681+	−.3312+	−.3929+
4.4	−.085	−.0185	−.9261+	−.0108
4.6	−.079	−.0410	−.0202	−.0231
4.8	−.069	−.0618	−.0302	−.0345
5.0	−.067	−.0818	−.0392	−.0444
5.2	−.063	−.1003	−.0478	−.0534
5.4	−.061	−.1176	−.0551	−.0615
5.6	−.058	−.1339	−.0621	−.0689
5.8	−.055	−.1494	−.0686	−.0757
6.0	−.053	−.1638	−.0745	−.0819
6.2	−.051	−.1778	−.0801	−.0877
6.4	−.049	−.1909	−.0853	−.0930
6.6	−.047	−.2028	−.0901	−.0980
6.8	−.046	−.2153	−.0947	−.1026
7.0	−.044	−.2265	−.0989	−.1069
7.2	−.043	−.2376	−.1029	−.1110
7.4	−.041	−.2477	−.1067	−.1148
7.6	−.040	−.2577	−.1103	−.1184
7.8	−.039	−.2671	−.1136	−.1218
8.0	−.038	−.2762	−.1168	−.1250
8.2	−.037	−.2850	−.1199	−.1280
8.4	−.036	−.2935	−.1225	−.1309
8.6	−.035	−.3016	−.1255	−.1336
8.8	−.035	−.3092	−.1281	−.1362
9.0	−.034	−.3166	−.1306	−.1387
9.2	−.034	−.3241	−.1330	−.1411

$\alpha_3 = 0.25$

α_4	LAM 1	LAM 2	LAM 3	LAM 4
2.0	−1.465	.2746	.0105	.7016
2.2	−1.084	.2847	.0506	.5508
2.4	−.790	.2820	.0843	.4298
2.6	−.550	.2850	.1062	.3226
2.8	−.398	.2369	.1099	.2385
3.0	−.258	.1987	.0996	.1763
3.2	−.237	.1619	.0831	.1300
3.4	−.196	.1266	.0653	.0982
3.6	−.167	.0937	.0481	.0656
3.8	−.147	.0632	.0321	.0421
4.0	−.131	.0351	.0176	.0226
4.1	−.126	.0217	.0106	.0136
4.2	−.118	.8861+	.4408+	.5467+
4.3	−.113	−.3474+	−.1713+	−.2103+
4.4	−.108	−.0194	−.7343+	−.9175+
4.6	−.099	−.0380	−.0184	−.0228
4.8	−.092	−.0591	−.0282	−.0328
5.0	−.087	−.0790	−.0373	−.0436
5.2	−.082	−.0974	−.0455	−.0527
5.4	−.077	−.1149	−.0531	−.0611
5.6	−.073	−.1312	−.0601	−.0683
5.8	−.070	−.1467	−.0645	−.0754
6.0	−.067	−.1613	−.0725	−.0817
6.2	−.064	−.1753	−.0781	−.0876
6.4	−.062	−.1885	−.0833	−.0930
6.6	−.059	−.2010	−.0882	−.0980
6.8	−.054	−.2129	−.0927	−.1027
7.0	−.055	−.2242	−.0970	−.1074
7.2	−.054	−.2350	−.1010	−.1111
7.4	−.052	−.2455	−.1048	−.1150
7.6	−.051	−.2554	−.1084	−.1186
7.8	−.049	−.2649	−.1118	−.1220
8.0	−.048	−.2742	−.1151	−.1252
8.2	−.047	−.2829	−.1181	−.1283
8.4	−.046	−.2914	−.1210	−.1312
8.6	−.045	−.2995	−.1238	−.1339
8.8	−.044	−.3072	−.1264	−.1365
9.0	−.043	−.3147	−.1289	−.1390
9.2	−.042	−.3220	−.1313	−.1414

ตารางที่ ก. (ต่อ)

	$\alpha_3 = 0.30$					$\alpha_3 = 0.35$					$\alpha_3 = 0.40$			
α_n	LAM 1	LAM 2	LAM 3	LAM 4	α_n	LAM 1	LAM 2	LAM 3	LAM 4	α_n	LAM 1	LAM 2	LAM 3	LAM 4
2.0	-1.550	.2640	.0000	.7020	2.0	-1.531	.2639	.0000*	.6036*	2.2	-1.354	.2582	.0129	.5683
2.2	-1.164	.2735	.0380	.5556	2.2	-1.252	.2668	.0256	.5399	2.4	-1.043	.2580	.0430	.4500
2.4	-.871	.2733	.0695	.4348	2.4	-.955	.2653	.0559	.4415	2.6	-.608	.2473	.0648	.3527
2.6	-.642	.2584	.0911	.3324	2.6	-.724	.2520	.0775	.3423	2.8	-.627	.2273	.0767	.2720
2.8	-.478	.2323	.0983	.2455	2.8	-.550	.2298	.0873	.2606	3.0	-.494	.2000	.0782	.2069
3.0	-.362	.1991	.0925	.1859	3.0	-.427	.1996	.0854	.1961	3.2	-.400	.1690	.0718	.1555
3.2	-.288	.1641	.0796	.1377	3.2	-.343	.1665	.0758	.1482	3.4	-.333	.1371	.0609	.1149
3.4	-.239	.1298	.0640	.1003	3.4	-.285	.1323	.0625	.1072	3.6	-.284	.1040	.0482	.0824
3.6	-.204	.0973	.0481	.0704	3.6	-.243	.1014	.0482	.0760	3.8	-.248	.0764	.0391	.0550
3.8	-.179	.0671	.0330	.0460	3.8	-.213	.0714	.0340	.0505	4.0	-.222	.0485	.0223	.0337
4.0	-.160	.0389	.0190	.0255	4.0	-.191	.0434	.0204	.0293	4.2	-.200	.0224	.0103	.0149
4.2	-.144	.0127	.0175*	.0035+	4.2	-.172	.0173	.0156*	.0112	4.3	-.190	.0100	.4597+	.6921+
4.3	-.138	.0789+	.0360+	.0486+	4.3	-.163	.0070+	.2293*	.3090+	4.4	-.182	-.0397+	-.0182+	-.0254++
4.4	-.131	-.0116	-.3594+	-.7037+	4.4	-.156	-.1106*	-.3332+	-.4431*	4.5	-.174	-.0116	-.0204+	-.0533+
4.5	-.129	-.0331	-.0110	-.0139	4.5	-.151	-.0187	-.8723*	-.0115	4.6	-.166	-.0208	-.0113	-.0153
4.6	-.121	-.0343	-.0143	-.0203	4.6	-.142	-.0298	-.0139	-.0180	4.8	-.155	-.0462	-.0209	-.0277
4.8	-.113	-.0554	-.0260	-.0319	4.8	-.132	-.0511	-.0264	-.0300	5.0	-.146	-.0662	-.0297	-.0367
5.0	-.105	-.0752	-.0350	-.0423	5.0	-.124	-.0710	-.0338	-.0407	5.2	-.138	-.0850	-.0379	-.0485
5.2	-.100	-.0939	-.0432	-.0517	5.2	-.117	-.0898	-.0407	-.0503	5.4	-.129	-.1027	-.0455	-.0574
5.4	-.094	-.1114	-.0504	-.0601	5.4	-.110	-.1074	-.0483	-.0589	5.6	-.122	-.1194	-.0525	-.0654
5.6	-.089	-.1279	-.0578	-.0678	5.6	-.105	-.1240	-.0553	-.0468	5.8	-.115	-.1352	-.0591	-.0727
5.8	-.085	-.1435	-.0643	-.0748	5.8	-.100	-.1396	-.0618	-.0739	6.0	-.111	-.1501	-.0651	-.0794
6.0	-.081	-.1582	-.0703	-.0812	6.0	-.096	-.1545	-.0674	-.0805	6.2	-.106	-.1643	-.0700	-.0856
6.2	-.078	-.1722	-.0759	-.0872	6.2	-.091	-.1685	-.0735	-.0865	6.4	-.102	-.1778	-.0761	-.0913
6.4	-.075	-.1854	-.0811	-.0927	6.4	-.088	-.1810	-.0787	-.0921	6.6	-.098	-.1906	-.0811	-.0966
6.6	-.072	-.1979	-.0860	-.0977	6.6	-.085	-.1945	-.0836	-.0973	6.8	-.094	-.2026	-.0857	-.1014
6.8	-.069	-.2100	-.0906	-.1025	6.8	-.082	-.2067	-.0883	-.1021	7.0	-.091	-.2142	-.0901	-.1060
7.0	-.067	-.2218	-.0949	-.1069	7.0	-.079	-.2181	-.0926	-.1064	7.2	-.089	-.2253	-.0942	-.1103
7.2	-.065	-.2325	-.0990	-.1111	7.2	-.077	-.2291	-.0967	-.1108	7.4	-.086	-.2359	-.0981	-.1143
7.4	-.063	-.2427	-.1028	-.1149	7.4	-.074	-.2396	-.1006	-.1147	7.6	-.083	-.2459	-.1018	-.1180
7.6	-.061	-.2528	-.1064	-.1186	7.6	-.072	-.2496	-.1042	-.1184	7.8	-.081	-.2556	-.1053	-.1216
7.8	-.060	-.2623	-.1098	-.1220	7.8	-.070	-.2593	-.1077	-.1219	8.0	-.079	-.2650	-.1096	-.1249
8.0	-.058	-.2716	-.1131	-.1253	8.0	-.068	-.2685	-.1109	-.1252	8.2	-.077	-.2741	-.1118	-.1281
8.2	-.056	-.2805	-.1162	-.1284	8.2	-.066	-.2775	-.1141	-.1283	8.4	-.075	-.2827	-.1148	-.1311
8.4	-.055	-.2889	-.1191	-.1313	8.4	-.065	-.2860	-.1170	-.1313	8.6	-.073	-.2908	-.1176	-.1339
8.6	-.054	-.2971	-.1219	-.1341	8.6	-.064	-.2943	-.1198	-.1341	8.8	-.072	-.2988	-.1203	-.1366
8.8	-.053	-.3050	-.1246	-.1367	8.8	-.062	-.3030	-.1225	-.1367	9.0	-.070	-.3066	-.1229	-.1391
9.0	-.052	-.3125	-.1271	-.1392	9.0	-.060	-.3096	-.1251	-.1392	9.2	-.069	-.3139	-.1254	-.1416
9.2	-.051	-.3197	-.1295	-.1416	9.2	-.059	-.3172	-.1376	-.1417	9.4	-.067	-.3210	-.1278	-.1439

	$\alpha_3 = 0.45$					$\alpha_3 = 0.50$					$\alpha_3 = 0.55$			
α_n	LAM 1	LAM 2	LAM 3	LAM 4	α_n	LAM 1	LAM 2	LAM 3	LAM 4	α_n	LAM 1	LAM 2	LAM 3	LAM 4
2.2	-1.471	.2500	.0000	.5812	2.4	-1.245	.2445	.0178	.4748	2.4	-1.370	.2379	.4463+	.4931
2.4	-1.138	.2511	.0305	.4608	2.6	-.987	.2376	.0410	.3770	2.6	-1.097	.2331	.0292	.3920
2.6	-.894	.2424	.0528	.3661	2.8	-.750	.2225	.0561	.2969	2.8	-.818	.2202	.0459	.3109
2.8	-.707	.2248	.0663	.2840	3.0	-.639	.2006	.0680	.2307	3.0	-.716	.2009	.0555	.2440
3.0	-.565	.2003	.0707	.2184	3.2	-.525	.1742	.0623	.1768	3.2	-.593	.1767	.0572	.1889
3.2	-.460	.1716	.0674	.1657	3.4	-.440	.1454	.0544	.1332	3.4	-.499	.1497	.0530	.1438
3.4	-.384	.1412	.0590	.1236	3.6	-.376	.1163	.0475	.0979	3.6	-.428	.1217	.0467	.1070
3.6	-.329	.1110	.0380	.0897	3.8	-.329	.0877	.0389	.0689	3.8	-.372	.0940	.0376	.0767
3.8	-.287	.0816	.0361	.0619	4.0	-.290	.0604	.0299	.0447	4.0	-.330	.0670	.0275	.0514
4.0	-.255	.0542	.0241	.0388	4.2	-.262	.0345	.0149	.0243	4.2	-.290	.0413	.0172	.0301
4.2	-.230	.0282	.0126	.0193	4.3	-.248	.0221	.9502+	.0152	4.4	-.265	.0170	.7749+	.0118
4.3	-.221	.0158	.7065+	.0106	4.4	-.235	.0101	.4863+	.6815+	4.5	-.251	.5355+	.3258+	.3604+
4.4	-.208	.0102+	.1822+	.0691+	4.5	-.228	.1852*	.0700+	-.3066+	4.6	-.247	-.5954+	-.2915+	-.3975+
4.5	-.200	-.7861+	-.3505+	-.5065+	4.6	-.219	-.0130	-.5570+	-.6330+	4.7	-.237	-.0160	-.7100+	-.0171
4.6	-.192	-.0181	-.8311+	-.0131	4.8	-.203	-.0344	-.0166	-.0216	4.8	-.227	-.0276	-.0117	-.0178
4.8	-.178	-.0406	-.0208	-.0289	5.0	-.189	-.0546	-.0234	-.0333	5.0	-.213	-.0490	-.0203	-.0300
5.0	-.168	-.0607	-.0268	-.0362	5.2	-.177	-.0737	-.0317	-.0438	5.2	-.200	-.0671	-.0363	-.0408
5.2	-.157	-.0796	-.0349	-.0464	5.4	-.167	-.0917	-.0393	-.0532	5.4	-.187	-.0852	-.0359	-.0505
5.4	-.147	-.0975	-.0425	-.0553	5.6	-.157	-.1087	-.0464	-.0617	5.6	-.177	-.1024	-.0430	-.0593
5.6	-.140	-.1142	-.0495	-.0637	5.8	-.150	-.1246	-.0529	-.0694	5.8	-.169	-.1184	-.0495	-.0672
5.8	-.132	-.1302	-.0561	-.0712	6.0	-.142	-.1398	-.0591	-.0764	6.0	-.161	-.1338	-.0557	-.0745
6.0	-.127	-.1453	-.0622	-.0781	6.2	-.137	-.1542	-.0648	-.0829	6.2	-.153	-.1483	-.0615	-.0811
6.2	-.121	-.1595	-.0679	-.0844	6.4	-.131	-.1679	-.0702	-.0889	6.4	-.147	-.1620	-.0669	-.0872
6.4	-.116	-.1731	-.0733	-.0902	6.6	-.126	-.1809	-.0753	-.0944	6.6	-.141	-.1753	-.0721	-.0929
6.6	-.112	-.1860	-.0783	-.0956	6.8	-.122	-.1933	-.0800	-.0995	6.8	-.136	-.1878	-.0769	-.0981
6.8	-.108	-.1983	-.0830	-.1006	7.0	-.117	-.2050	-.0845	-.1042	7.0	-.131	-.1997	-.0814	-.1030
7.0	-.104	-.2099	-.0874	-.1052	7.2	-.114	-.2163	-.0887	-.1087	7.2	-.127	-.2111	-.0857	-.1075
7.2	-.101	-.2211	-.0916	-.1096	7.4	-.110	-.2270	-.0927	-.1126	7.4	-.123	-.2218	-.0897	-.1117
7.4	-.097	-.2316	-.0955	-.1136	7.6	-.107	-.2374	-.0965	-.1167	7.6	-.119	-.2322	-.0933	-.1157
7.6	-.095	-.2419	-.0992	-.1175	7.8	-.104	-.2473	-.1001	-.1204	7.8	-.115	-.2422	-.0972	-.1194
7.8	-.092	-.2518	-.1028	-.1211	8.0	-.101	-.2567	-.1035	-.1238	8.0	-.113	-.2519	-.1006	-.1230
8.0	-.090	-.2611	-.1061	-.1245	8.2	-.098	-.2659	-.1067	-.1271	8.2	-.110	-.2610	-.1039	-.1263
8.2	-.088	-.2702	-.1093	-.1277	8.4	-.095	-.2745	-.1098	-.1301	8.4	-.107	-.2698	-.1070	-.1294
8.4	-.085	-.2789	-.1124	-.1307	8.6	-.094	-.2830	-.1127	-.1331	8.6	-.104	-.2784	-.1100	-.1324
8.6	-.084	-.2871	-.1152	-.1336	8.8	-.091	-.2910	-.1155	-.1358	8.8	-.102	-.2864	-.1128	-.1352
8.8	-.081	-.2953	-.1180	-.1363	9.0	-.089	-.2990	-.1181	-.1384	9.0	-.100	-.2943	-.1155	-.1379
9.0	-.080	-.3029	-.1206	-.1389	9.2	-.088	-.3064	-.1207	-.1410	9.2	-.097	-.3019	-.1181	-.1404
9.2	-.078	-.3102	-.1231	-.1413	9.4	-.086	-.3134	-.1231	-.1433	9.4	-.095	-.3092	-.1206	-.1428
9.4	-.076	-.3176	-.1256	-.1437	9.6	-.084	-.3206	-.1255	-.1456	9.6	-.094	-.3164	-.1230	-.1452

ตารางที่ ก. (ต่อ)

	$\alpha_3 = 0.60$					$\alpha_3 = 0.65$					$\alpha_3 = 0.70$			
α_4	LAM 1	LAM 2	LAM 3	LAM 4	α_4	LAM 1	LAM 2	LAM 3	LAM 4	α_4	LAM 1	LAM 2	LAM 3	LAM 4
2.4	-1.011	.2347	.0000*	.4951*	2.6	-1.339	.2240	.3908*	.4318	2.6	-1.369	.2217	.0000*	.4355
2.6	-1.198	.2286	.0171	.4098	2.8	-1.078	.2157	.0246	.3443	2.8	-1.198	.2132	.0130	.3651
2.8	-.972	.2180	.0355	.3265	3.0	-.889	.2010	.0380	.2742	3.0	-.987	.2008	.0286	.2916
3.0	-.800	.2009	.0467	.2583	3.2	-.744	.1812	.0449	.2163	3.2	-.828	.1833	.0378	.2310
3.2	-.665	.1791	.0516	.2020	3.4	-.630	.1582	.0464	.1682	3.4	-.704	.1621	.0416	.1821
3.4	-.562	.1539	.0500	.1554	3.6	-.542	.1330	.0435	.1283	3.6	-.606	.1385	.0409	.1400
3.6	-.482	.1273	.0454	.1171	3.8	-.472	.1072	.0377	.0953	3.8	-.529	.1130	.0369	.1040
3.8	-.420	.1005	.0379	.0854	4.0	-.418	.0813	.0300	.0674	4.0	-.467	.0889	.0307	.0743
4.0	-.372	.0740	.0289	.0589	4.2	-.374	.0564	.0215	.0440	4.2	-.419	.0643	.0232	.0522
4.2	-.335	.0466	.0194	.0366	4.4	-.338	.0323	.0128	.0239	4.4	-.379	.0406	.0151	.0312
4.4	-.302	.0244	.9911*	.0175	4.5	-.324	.0207	.8137*	.0150	4.6	-.344	.0178	.6767*	.0138
4.5	-.289	.0128	.5219*	.8965*	4.6	-.310	.1399*	.3719*	.6660*	4.7	-.331	.6799*	.2607*	.4472*
4.6	-.277	.1892*	.0611*	.1035*	4.7	-.297	.1593*	.0434*	.1106*	4.8	-.317	-.3917*	-.1512*	-.2750*
4.7	-.266	-.9831*	-.3918*	-.6425*	4.8	-.285	.0123	-.8921*	-.8391*	4.9	-.305	-.0196	-.5574*	-.9093*
4.8	-.256	-.0202	-.8326*	-.0136	5.0	-.265	-.0328	-.0182	-.0214	5.0	-.294	-.0295	-.9565*	-.0166
5.0	-.234	-.0507	-.0168	-.0261	5.2	-.248	-.0528	-.0211	-.0394	5.2	-.276	-.0461	-.0173	-.0269
5.2	-.212	-.0600	-.0244	-.0373	5.4	-.231	-.0707	-.0284	-.0434	5.4	-.257	-.0626	-.0247	-.0398
5.4	-.209	-.0782	-.0323	-.0474	5.6	-.219	-.0880	-.0356	-.0532	5.6	-.243	-.0802	-.0317	-.0496
5.6	-.197	-.0956	-.0394	-.0565	5.8	-.209	-.1046	-.0422	-.0618	5.8	-.229	-.0967	-.0383	-.0564
5.8	-.187	-.1118	-.0460	-.0647	6.0	-.198	-.1201	-.0484	-.9495	6.0	-.215	-.1125	-.0445	-.0465
6.0	-.179	-.1273	-.0522	-.0722	6.2	-.189	-.1350	-.0543	-.0766	6.2	-.209	-.1275	-.0504	-.0738
6.2	-.171	-.1419	-.0580	-.0790	6.4	-.181	-.1491	-.0598	-.0831	6.4	-.199	-.1417	-.0560	-.0805
6.4	-.163	-.1559	-.0635	-.0853	6.6	-.174	-.1625	-.0650	-.0891	6.6	-.191	-.1552	-.0613	-.0867
6.6	-.157	-.1691	-.0686	-.0911	6.8	-.167	-.1753	-.0700	-.0946	6.8	-.184	-.1682	-.0662	-.0920
6.8	-.151	-.1818	-.0735	-.0965	7.0	-.161	-.1874	-.0746	-.0997	7.0	-.177	-.1805	-.0709	-.0977
7.0	-.146	-.1938	-.0781	-.1015	7.2	-.155	-.1991	-.0790	-.1045	7.2	-.170	-.1923	-.0754	-.1026
7.2	-.141	-.2052	-.0824	-.1061	7.4	-.150	-.2100	-.0831	-.1089	7.4	-.165	-.2036	-.0796	-.1072
7.4	-.137	-.2163	-.0865	-.1105	7.6	-.145	-.2208	-.0871	-.1131	7.6	-.160	-.2144	-.0836	-.1115
7.6	-.132	-.2267	-.0904	-.1145	7.8	-.141	-.2309	-.0908	-.1170	7.8	-.155	-.2346	-.0874	-.1155
7.8	-.128	-.2368	-.0941	-.1163	8.0	-.137	-.2407	-.0944	-.1207	8.0	-.151	-.2346	-.0910	-.1193
8.0	-.124	-.2465	-.0976	-.1219	8.2	-.134	-.2501	-.0977	-.1242	8.2	-.147	-.2439	-.0944	-.1228
8.2	-.121	-.2557	-.1009	-.1253	8.4	-.130	-.2591	-.1010	-.1274	8.4	-.143	-.2532	-.0977	-.1262
8.4	-.118	-.2647	-.1041	-.1285	8.6	-.127	-.2677	-.1040	-.1305	8.6	-.139	-.2618	-.1008	-.1293
8.6	-.115	-.2732	-.1071	-.1315	8.8	-.124	-.2761	-.1069	-.1335	8.8	-.136	-.2703	-.1038	-.1323
8.8	-.113	-.2815	-.1100	-.1344	9.0	-.121	-.2840	-.1097	-.1362	9.0	-.133	-.2784	-.1066	-.1352
9.0	-.110	-.2894	-.1127	-.1371	9.2	-.119	-.2919	-.1124	-.1389	9.2	-.130	-.2862	-.1093	-.1379
9.2	-.108	-.2970	-.1153	-.1397	9.4	-.116	-.2994	-.1150	-.1414	9.4	-.127	-.2937	-.1119	-.1406
9.4	-.105	-.3045	-.1179	-.1422	9.6	-.114	-.3065	-.1174	-.1438	9.6	-.125	-.3011	-.1144	-.1429
9.6	-.103	-.3116	-.1203	-.1445	9.6	-.112	-.3136	-.1198	-.1461	9.8	-.122	-.3081	-.1168	-.1452

	$\alpha_3 = 0.75$					$\alpha_3 = 0.80$					$\alpha_3 = 0.85$			
α_4	LAM 1	LAM 2	LAM 3	LAM 4	α_4	LAM 1	LAM 2	LAM 3	LAM 4	α_4	LAM 1	LAM 2	LAM 3	LAM 4
2.8	-1.334	.2104	.0000	.3903	3.0	-1.225	.1996	.6847*	.3356	3.0	-1.303	.1985	.0000*	.3488
3.0	-1.097	.2003	.0163	.3119	3.2	-1.025	.1864	.0211	.2687	3.2	-1.148	.1875	.0110	.2913
3.2	-.921	.1850	.0299	.2492	3.4	-.874	.1692	.0295	.2143	3.4	-.973	.1723	.0220	.2332
3.4	-.785	.1659	.0360	.1974	3.6	-.754	.1492	.0333	.1691	3.6	-.838	.1541	.0281	.1855
3.6	-.677	.1440	.0375	.1542	3.8	-.657	.1272	.0333	.1310	3.8	-.732	.1336	.0301	.1455
3.8	-.590	.1208	.0355	.1179	4.0	-.582	.1042	.0303	.0985	4.0	-.645	.1119	.0291	.1117
4.0	-.521	.0966	.0301	.0873	4.2	-.515	.0810	.0254	.0716	4.2	-.577	.0895	.0256	.0829
4.2	-.466	.0724	.0246	.0614	4.4	-.468	.0580	.0192	.0482	4.4	-.519	.0671	.0206	.0582
4.4	-.419	.0492	.0174	.0392	4.6	-.425	.0357	.0123	.0281	4.6	-.472	.0451	.0146	.0370
4.6	-.384	.0266	.9663*	.0202	4.8	-.392	.0142	.5035*	.0107	4.8	-.430	.0238	.8001*	.0165
4.7	-.367	.0156	.5749*	.0116	4.9	-.375	.3770*	.1862*	.2770*	4.9	-.413	.0134	.4581*	.0102
4.8	-.352	.1940*	.1033*	.3581*	5.0	-.361	.6391*	.2278*	.4535*	5.0	-.398	.3503*	.1211*	.2613*
4.9	-.339	-.5509*	-.2061*	-.3916*	5.1	-.349	.0164	.9584*	.0176	5.1	-.383	-.6701*	-.2345*	-.4066*
5.0	-.324	-.0157	-.5915*	-.0109	5.2	-.335	-.0241	.9520*	-.0181	5.2	-.370	-.0165	-.5800*	-.0118
5.2	-.306	-.0333	-.0134	-.0238	5.4	-.313	-.0449	-.0147	-.0301	5.4	-.344	-.0353	-.0127	-.0248
5.4	-.284	-.0532	-.0207	-.0392	5.6	-.295	-.0624	-.0235	-.0408	5.6	-.324	-.0531	-.0193	-.0356
5.6	-.268	-.0716	-.0276	-.0494	5.8	-.279	-.0795	-.0300	-.0504	5.8	-.305	-.0703	-.0258	-.0452
5.8	-.254	-.0889	-.0342	-.0587	6.0	-.264	-.0958	-.0363	-.0592	6.0	-.290	-.0864	-.0319	-.0540
6.0	-.240	-.1044	-.0405	-.0630	6.2	-.251	-.1110	-.0422	-.0671	6.2	-.275	-.1017	-.0370	-.0631
6.2	-.229	-.1195	-.0464	-.0706	6.4	-.240	-.1255	-.0478	-.0743	6.4	-.262	-.1163	-.0435	-.0707
6.4	-.219	-.1339	-.0520	-.0776	6.6	-.230	-.1394	-.0531	-.0810	6.6	-.251	-.1307	-.0486	-.0776
6.6	-.209	-.1476	-.0573	-.0840	6.8	-.220	-.1527	-.0582	-.0871	6.8	-.241	-.1442	-.0539	-.0846
6.8	-.201	-.1607	-.0623	-.0899	7.0	-.212	-.1653	-.0630	-.0928	7.0	-.231	-.1570	-.0588	-.0911
7.0	-.194	-.1731	-.0670	-.0954	7.2	-.204	-.1774	-.0676	-.0980	7.2	-.223	-.1692	-.0634	-.0953
7.2	-.188	-.1851	-.0715	-.1005	7.4	-.197	-.1889	-.0719	-.1027	7.4	-.215	-.1809	-.0678	-.1064
7.4	-.181	-.1964	-.0758	-.1052	7.6	-.191	-.2000	-.0760	-.1075	7.6	-.207	-.1921	-.0720	-.1051
7.6	-.175	-.2074	-.0837	-.1096	7.8	-.185	-.2104	-.0799	-.1117	7.8	-.201	-.2028	-.0759	-.1098
7.8	-.170	-.2177	-.0837	-.1137	8.0	-.180	-.2205	-.0836	-.1157	8.0	-.195	-.2130	-.0797	-.1136
8.0	-.165	-.2278	-.0874	-.1176	8.2	-.174	-.2304	-.0872	-.1195	8.2	-.190	-.2229	-.0833	-.1175
8.2	-.160	-.2375	-.0909	-.1213	8.4	-.169	-.2397	-.0906	-.1230	8.4	-.184	-.2324	-.0868	-.1211
8.4	-.156	-.2466	-.0942	-.1247	8.6	-.166	-.2488	-.0938	-.1264	8.6	-.179	-.2416	-.0901	-.1246
8.6	-.152	-.2554	-.0974	-.1279	8.8	-.161	-.2574	-.0969	-.1295	8.8	-.175	-.2503	-.0932	-.1279
8.8	-.148	-.2640	-.1004	-.1310	9.0	-.157	-.2658	-.0999	-.1325	9.0	-.171	-.2587	-.0962	-.1309
9.0	-.145	-.2722	-.1033	-.1339	9.2	-.154	-.2737	-.1027	-.1353	9.2	-.167	-.2669	-.0991	-.1338
9.2	-.142	-.2802	-.1061	-.1367	9.4	-.150	-.2815	-.1054	-.1380	9.4	-.163	-.2748	-.1019	-.1366
9.4	-.138	-.2879	-.1088	-.1393	9.6	-.147	-.2890	-.1080	-.1406	9.6	-.159	-.2823	-.1045	-.1392
9.6	-.135	-.2952	-.1113	-.1418	9.8	-.144	-.2962	-.1105	-.1430	9.8	-.156	-.2897	-.1071	-.1417
9.8	-.133	-.3023	-.1137	-.1442	10.0	-.141	-.3033	-.1129	-.1454	10.0	-.153	-.2967	-.1095	-.1441
10.0	-.130	-.3093	-.1161	-.1465	10.2	-.139	-.3100	-.1152	-.1476	10.2	-.150	-.3037	-.1119	-.1464

ตารางที่ ก. (ต่อ)

α₃ = 0.90

α₄	LAB 1	LAB 2	LAB 3	LAB 4
3.2	-1.277	.1880	.0000	.3160
3.4	-1.005	.1751	.0133	.2548
3.6	-.933	.1586	.0318	.2039
3.8	-.814	.1397	.0260	.1615
4.0	-.717	.1193	.0283	.1258
4.2	-.635	.0979	.6291	.0953
4.4	-.575	.0762	.0214	.0693
4.6	-.522	.0547	.0166	.0468
4.8	-.478	.0337	.0106	.0273
5.0	-.439	.0132	.4328	.0102
5.1	-.422	-.3339	.1111	.2526
5.2	-.407	-.4388	.2156	.4735
5.3	-.394	-.0159	.5438	.0116
5.4	-.379	-.0252	.8698	.0180
5.6	-.353	-.0432	.0152	.0298
5.8	-.334	-.0605	.0215	.0405
6.0	-.317	-.0788	.0275	.0500
6.2	-.301	-.0924	.0334	.0567
6.4	-.287	-.1073	.0390	.0464
6.6	-.273	-.1215	.0444	.0738
6.8	-.262	-.1352	.0495	.0405
7.0	-.252	-.1481	.0544	.0866
7.2	-.242	-.1606	.0991	.0923
7.4	-.233	-.1723	.0635	.0975
7.6	-.225	-.1838	.0678	.1024
7.8	-.218	-.1947	.0718	.1070
8.0	-.212	-.2051	.0756	.1113
8.2	-.205	-.2151	.0793	.1153
8.4	-.199	-.2246	.0828	.1190
8.6	-.194	-.2340	.0862	.1226
8.8	-.189	-.2428	.0894	.1259
9.0	-.185	-.2514	.0934	.1291
9.2	-.180	-.2597	.0956	.1321
9.4	-.176	-.2676	.0982	.1349
9.6	-.172	-.2753	.1009	.1376
9.8	-.168	-.2827	.1035	.1402
10.0	-.165	-.2900	.1060	.1427
10.2	-.162	-.2969	.1084	.1450
10.4	-.159	-.3035	.1107	.1472

α₃ = 1.00

α₄	LAB 1	LAB 2	LAB 3	LAB 4
3.6	-1.243	.1772	.0000	.2854
3.6	-1.169	.1644	.4826	.2490
3.8	-1.016	.1509	.0101	.1996
4.0	-.886	.1333	.0193	.1500
4.2	-.787	.1142	.0212	.1244
4.4	-.706	.0903	.0204	.0850
4.6	-.636	.0701	.0192	.0697
4.8	-.581	.0539	.0144	.0477
5.0	-.533	.0380	.9695	.0205
5.2	-.492	.0146	.4393	.0117
5.3	-.474	.5192	.1584	.4061
5.4	-.445	-.0317	.0101	-.0282
5.5	-.442	-.0132	.4176	.9986
5.6	-.429	-.0322	.7097	.0164
6.0	-.403	-.0395	.0139	-.0202
6.0	-.379	-.0562	.0197	.0388
6.2	-.358	-.0721	.0244	.0484
6.4	-.341	-.0873	.0299	.0571
6.6	-.325	-.1019	.0352	.0631
6.8	-.309	-.1158	.0404	.0723
7.0	-.297	-.1291	.0453	.0790
7.2	-.285	-.1419	.0500	.0852
7.4	-.275	-.1540	.0585	.0909
7.6	-.265	-.1658	.0589	.0962
7.8	-.256	-.1769	.0630	.1011
8.0	-.248	-.1878	.0670	.1056
8.2	-.241	-.1980	.0707	.1101
8.4	-.233	-.2079	.0744	.1141
8.6	-.227	-.2174	.0778	.1179
8.8	-.220	-.2267	.0812	.1215
9.0	-.215	-.2356	.0846	.1248
9.2	-.210	-.2440	.0874	.1281
9.4	-.204	-.2522	.0904	.1311
9.6	-.200	-.2602	.0932	.1340
9.8	-.195	-.2678	.0959	.1367
10.0	-.191	-.2752	.0985	.1393
10.2	-.187	-.2824	.1010	.1418
10.4	-.184	-.2893	.1034	.1442
10.6	-.180	-.2959	.1057	.1464

α₃ = 1.10

α₄	LAB 1	LAB 2	LAB 3	LAB 4
3.8	-1.215	.1562	.0000	.2379
4.0	-1.108	.1459	.6035	.2013
4.2	-.974	.1294	.0125	.1607
4.4	-.869	.1117	.0157	.1267
4.6	-.781	.0933	.0165	.0977
4.8	-.738	.0743	.0164	.0727
5.0	-.647	.0552	.0120	.0508
5.2	-.596	.0365	.9166	.0318
5.4	-.552	.0141	.4839	.0150
5.5	-.532	.9036	.2484	.7342
5.6	-.517	-.0997	.0271	.0795
5.7	-.197	-.0629	.2479	.6724
5.8	-.481	-.0171	.5046	.0132
6.0	-.451	-.0360	.0103	.0251
6.2	-.427	-.0501	.0155	.0358
6.4	-.403	-.0656	.0208	.0455
6.6	-.384	-.0805	.0259	.0544
6.8	-.366	-.0947	.0309	.0624
7.0	-.350	-.1084	.0358	.0698
7.2	-.335	-.1214	.0405	.0766
7.4	-.322	-.1341	.0451	.0829
7.6	-.311	-.1460	.0494	.0887
7.8	-.299	-.1577	.0537	.0941
8.0	-.289	-.1687	.0577	.0991
8.2	-.280	-.1794	.0616	.1036
8.4	-.271	-.1896	.0653	.1082
8.6	-.263	-.1994	.0689	.1123
8.8	-.256	-.2090	.0724	.1162
9.0	-.249	-.2180	.0757	.1198
9.2	-.242	-.2247	.0788	.1232
9.4	-.236	-.2353	.0819	.1265
9.6	-.231	-.2435	.0848	.1296
9.8	-.226	-.2513	.0876	.1325
10.0	-.221	-.2590	.0903	.1353
10.2	-.216	-.2664	.0930	.1379
10.4	-.211	-.2735	.0955	.1404
10.6	-.207	-.2804	.0979	.1426
10.8	-.203	-.2870	.1002	.1451
11.0	-.199	-.2936	.1025	.1473

α₃ = 1.20

α₄	LAB 1	LAB 2	LAB 3	LAB 4
4.2	-1.183	.1407	.0000	.1997
4.4	-1.083	.1278	.3096	.1675
4.6	-.965	.1113	.9968	.1339
4.8	-.870	.0941	.0122	.1036
5.0	-.792	.0764	.0124	.0788
5.2	-.723	.0586	.0112	.0665
5.4	-.661	.0408	.0705	.0372
5.6	-.619	.0233	.5411	.0202
5.7	-.597	.0146	.3925	.0124
5.8	-.577	.6088	.1515	.5050
5.9	-.558	-.2319	.0594	.1684
6.0	-.562	-.0962	.0245	.0788
6.2	-.508	-.0268	.7343	.0206
6.4	-.484	.0124	.0120	.0315
6.6	-.454	-.0575	.0168	.0414
6.8	-.432	-.0719	.0215	.0504
7.0	-.413	-.0860	.0262	.0587
7.2	-.394	-.0993	.0308	.0663
7.4	-.378	-.1123	.0353	.0732
7.6	-.362	-.1247	.0397	.0796
7.8	-.349	-.1366	.0439	.0856
8.0	-.337	-.1480	.0480	.0911
8.2	-.325	-.1589	.0519	.0967
8.4	-.314	-.1695	.0558	.1010
8.6	-.305	-.1796	.0596	.1055
8.8	-.296	-.1896	.0630	.1058
9.0	-.287	-.1990	.0664	.1137
9.2	-.280	-.2082	.0697	.1175
9.4	-.273	-.2168	.0728	.1210
9.6	-.265	-.2253	.0759	.1243
9.8	-.259	-.2335	.0788	.1275
10.0	-.254	-.2414	.0816	.1305
10.2	-.248	-.2490	.0843	.1333
10.4	-.242	-.2564	.0870	.1360
10.6	-.237	-.2636	.0895	.1386
10.8	-.233	-.2704	.0919	.1410
11.0	-.228	-.2772	.0943	.1434
11.2	-.224	-.2837	.0966	.1456
11.4	-.220	-.2901	.0988	.1478

α₃ = 1.30

α₄	LAB 1	LAB 2	LAB 3	LAB 4
4.6	-1.156	.1244	.0000	.1679
4.8	-1.084	.1129	.3174	.1435
5.0	-.975	.0968	.7325	.1130
5.2	-.884	.0802	.9035	.0870
5.4	-.812	.0634	.9148	.0688
5.6	-.739	.0466	.7899	.0647
5.8	-.695	.0300	.5783	.0273
6.0	-.604	.0286	.6419	.0239
6.1	-.617	.8446	.0100	.0375
6.2	-.614	-.0526	.0119	.0442
6.3	-.595	-.0104	.2430	.8504
6.4	-.572	-.0182	.4399	.0146
6.6	-.535	-.0333	.8469	.0258
6.8	-.510	-.0480	.0127	.0360
7.0	-.485	-.0622	.0170	.0463
7.2	-.463	-.0758	.0256	.0538
7.4	-.443	-.0896	.0256	.0615
7.6	-.424	-.1017	.0298	.0688
7.8	-.407	-.1140	.0340	.0754
8.0	-.392	-.1259	.0380	.0816
8.2	-.378	-.1372	.0420	.0873
8.4	-.365	-.1460	.0456	.0926
8.6	-.353	-.1585	.0495	.0975
8.8	-.342	-.1667	.0531	.1022
9.0	-.332	-.1784	.0566	.1065
9.2	-.322	-.1878	.0600	.1106
9.4	-.314	-.1969	.0632	.1145
9.6	-.305	-.2057	.0664	.1181
9.8	-.298	-.2141	.0694	.1215
10.0	-.291	-.2223	.0723	.1248
10.2	-.284	-.2304	.0752	.1279
10.4	-.277	-.2379	.0779	.1308
10.6	-.272	-.2453	.0805	.1336
10.8	-.266	-.2525	.0831	.1362
11.0	-.261	-.2595	.0855	.1388
11.2	-.256	-.2662	.0879	.1412
11.4	-.251	-.2728	.0902	.1435
11.6	-.246	-.2792	.0925	.1457
11.8	-.242	-.2852	.0946	.1478

α₃ = 1.40

α₄	LAB 1	LAB 2	LAB 3	LAB 4
5.0	-1.132	.1092	.0000	.1411
5.2	-1.106	.1011	.0787	.1268
5.4	-1.001	.0855	.4546	.0991
5.6	-.916	.0697	.6296	.0754
5.8	-.844	.0538	.8530	.0547
6.0	-.782	.0379	.5627	.0365
6.2	-.729	.0222	.3705	.0204
6.3	-.706	.0145	.2611	-.0130
6.4	-.683	.4822	.1292	.5887
6.5	-.660	-.1226	-.0244	-.1052
6.6	-.683	-.0268	-.1702	-.6966
6.8	-.607	-.0230	.5040	.0187
7.0	-.575	-.0373	.8670	.0293
7.2	-.547	-.0510	.0124	.0389
7.4	-.521	-.0645	.0163	.0478
7.6	-.498	-.0775	.0202	.0559
7.8	-.475	-.0900	.0282	.0633
8.0	-.458	-.1020	.0300	.0702
8.2	-.440	-.1137	.0319	.0766
8.4	-.423	-.1250	.0357	.0825
8.6	-.410	-.1358	.0393	.0881
8.8	-.395	-.1463	.0430	.0932
9.0	-.383	-.1564	.0465	.0980
9.2	-.372	-.1662	.0499	.1024
9.4	-.361	-.1756	.0532	.1068
9.6	-.351	-.1846	.0564	.1108
9.8	-.342	-.1935	.0595	.1146
10.0	-.333	-.2018	.0625	.1181
10.2	-.325	-.2102	.0655	.1215
10.4	-.317	-.2181	.0683	.1247
10.6	-.310	-.2257	.0710	.1277
10.8	-.303	-.2332	.0737	.1306
11.0	-.297	-.2405	.0762	.1324
11.2	-.291	-.2475	.0787	.1360
11.4	-.285	-.2542	.0811	.1385
11.6	-.279	-.2609	.0835	.1409
11.8	-.274	-.2671	.0857	.1431
12.0	-.269	-.2734	.0879	.1453
12.2	-.265	-.2794	.0900	.1474

ตารางที่ ก. (ต่อ)

$\alpha_3 = 1.50$

α_4	LAM 1	LAM 2	LAM 3	LAM 4
5.4	-1.112	.0951	.0000*	.1162
5.6	-1.103	.0886	.0000*	.1083
5.8	-1.042	.0773	.1949*	.0859
6.0	-.957	.0622	.3937*	.0677
6.2	-.883	.0471	.4861*	.0463
6.4	-.824	.0321	.3885*	.0313
6.6	-.688	.0566+	.0100**	.0494**
6.7	-.747	.9962+	.1938*	.9050+
6.8	-.714	-.0290+	-.48978	-.0256+
6.9	-.704	-.4446+	-.0768+	-.3002+
7.0	-.684	-.0115	-.2088+	-.9475+
7.2	-.647	-.0254	-.4989+	-.0210
7.4	-.615	-.0390	-.8156+	-.0312
7.6	-.585	-.0520	-.0115	-.0404
7.8	-.556	-.0648	-.0150	-.0489
8.0	-.536	-.0767	.0184	-.0565
8.2	-.514	-.0891	-.0221	-.0640
8.4	-.494	-.1007	-.0257	-.0707
8.6	-.476	-.1118	-.0292	-.0769
8.8	-.459	-.1225	-.0327	-.0826
9.0	-.443	-.1330	-.0362	-.0880
9.2	-.429	-.1431	-.0396	-.0931
9.4	-.416	-.1528	-.0429	-.0978
9.6	-.404	-.1622	-.0461	-.1032
9.8	-.392	-.1713	-.0493	-.1064
10.0	-.382	-.1803	-.0524	-.1104
10.2	-.372	-.1887	-.0553	-.1141
10.4	-.363	-.1969	-.0582	-.1176
10.6	-.354	-.2049	-.0611	-.1209
10.8	-.346	-.2127	-.0638	-.1241
11.0	-.338	-.2202	-.0665	-.1271
11.2	-.331	-.2273	-.0690	-.1299
11.4	-.325	-.2339	-.0713	-.1325
11.6	-.317	-.2418	-.0780	-.1353
11.8	-.311	-.3478	-.0763	-.1377
12.0	-.305	-.2548	-.0786	-.1401
12.2	-.300	-.2607	-.0808	-.1424
12.4	-.295	-.2662	-.0827	-.1444
12.6	-.289	-.2726	-.0851	-.1466

$\alpha_3 = 1.60$

α_4	LAM 1	LAM 2	LAM 3	LAM 4
6.0	-1.086	.0757	.0000*	.0896
6.2	-1.079	.0696	.0000	.0814
6.4	-1.011	.0573	.1699*	.0634
6.6	-.937	.0430	.2484+	.0459
6.8	-.879	.0287	.2597*	.0285
7.0	-.766	.0422+	.63548*	.0378+*
7.1	-.796	.77738+	.0069*	.7177+
7.2	-.771	-.0341+	.04348	-.0309+
7.3	-.751	-.5924+	-.0959+	-.5279+
7.4	-.731	-.0127	-.1942+	-.0111
7.6	-.693	-.0258	-.4383+	-.0218
7.8	-.659	-.0386	-.7111+	-.0316
8.0	-.630	-.0511	-.0100	-.0406
8.2	-.603	-.0633	-.0121	-.0489
8.4	-.577	-.0752	-.0163	-.0566+
8.6	-.553	-.0866	-.0196	-.0636
8.8	-.534	-.0972	-.0227	-.0699
9.0	-.515	-.1004	-.0261	-.0761
9.2	-.496	-.1187	-.0294	-.0819
9.4	-.480	-.1208	-.0326	-.0872
9.6	-.465	-.1385	-.0358	-.0922
9.8	-.452	-.1480	-.0369	-.0969
10.0	-.438	-.1572	-.0420	-.1013
10.2	-.426	-.1659	-.0450	-.1054
10.4	-.415	-.1745	-.0478	-.1093
10.6	-.404	-.1828	-.0508	-.1130
10.8	-.394	-.1908	-.0536	-.1165
11.0	-.385	-.1986	-.0563	-.1198
11.2	-.377	-.2062	-.0589	-.1230
11.4	-.368	-.2135	-.0615	-.1260
11.6	-.360	-.2206	-.0640	-.1288
11.8	-.352	-.2275	-.0663	-.1315
12.0	-.346	-.2341	-.0688	-.1341
12.2	-.339	-.2407	-.0711	-.1366
12.4	-.333	-.2471	-.0734	-.1390
12.6	-.328	-.2527	-.0753	-.1411
12.8	-.321	-.2592	-.0777	-.1434
13.0	-.316	-.2650	-.0797	-.1455
13.2	-.311	-.2706	-.0817	-.1475

$\alpha_3 = 1.70$

α_4	LAM 1	LAM 2	LAM 3	LAM 4
6.6	-1.064	.0580	.0000*	.0657
6.8	-1.057	.0525	.0000	.0598
7.0	-1.003	.0412	.1027+	.0441
7.2	-.935	.0275	.1513+	.0280
7.4	-.870	.0142	.1142*	.0138
7.5	-.852	.7548+	-.0686+	.7175*
7.6	-.828	-.0250+	.26018	-.0232+*
7.7	-.806	-.5469+	-.0619+	-.5000+
7.8	-.784	-.0119	-.1463+	-.0107
8.0	-.745	-.0245	-.3523+	-.0212
8.2	-.709	-.0367	-.5705+	-.0306
8.4	-.678	-.0487	-.0229+	-.0397
8.6	-.650	-.0603	-.0109	-.0470
8.8	-.622	-.0717	-.0138	-.0553+
9.0	-.598	-.0827	-.0167	-.0623
9.2	-.578	-.0923	-.0196	-.0688
9.4	-.557	-.1036	-.0226	-.0740
9.6	-.538	-.1136	-.0254	-.0804
9.8	-.521	-.1233	-.0286	-.0857
10.0	-.505	-.1329	-.0316	-.0907
10.2	-.485	-.1420	-.0346	-.0953
10.4	-.474	-.1509	-.0375	-.0997
10.6	-.463	-.1594	-.0403	-.1038
10.8	-.451	-.1677	-.0431	-.1077
11.0	-.440	-.1758	-.0458	-.1114
11.2	-.429	-.1837	-.0485	-.1149
11.4	-.419	-.1913	-.0511	-.1182
11.6	-.410	-.1988	-.0537	-.1214
11.8	-.401	-.2059	-.0562	-.1244
12.0	-.392	-.2128	-.0586	-.1272
12.2	-.384	-.2195	-.0610	-.1299
12.4	-.377	-.2261	-.0633	-.1325
12.6	-.369	-.2326	-.0656	-.1350
12.8	-.362	-.2388	-.0678	-.1373
13.0	-.356	-.2450	-.0700	-.1397
13.2	-.350	-.2508	-.0720	-.1419
13.4	-.344	-.2566	-.0741	-.1440
13.6	-.338	-.2622	-.0761	-.1460
13.8	-.333	-.2675	-.0780	-.1479*

$\alpha_3 = 1.80$

α_4	LAM 1	LAM 2	LAM 3	LAM 4
7.2	-1.045	.0417	.0000*	.0456
7.4	-1.039	.0367	.0000*	.0396
7.6	-1.007	.0284	.0378+	.0398
7.8	-.985	.0155	.0446+	.0155
7.9	-.918	.9177+	.0488+	.9006+
8.0	-.892	.2914+	.0193+	.2801+
8.1	-.864	-.3291+	-.0254+	-.1302+
8.2	-.846	-.9427+	-.0826+	-.8731+
8.4	-.804	-.0215	-.2289+	-.0192
8.6	-.767	-.0333	-.4103+	-.0268
8.8	-.733	-.0448	-.6190+	-.0376
9.0	-.702	-.0559	-.0889+	-.0456
9.2	-.675	-.0668	-.0109	-.0831
9.4	-.649	-.0774	-.0135	-.0601
9.6	-.625	-.0877	-.0162	-.0665
9.8	-.604	-.0978	-.0189	-.0726
10.0	-.583	-.1075	-.0217	-.0782
10.2	-.565	-.1169	-.0244	-.0835
10.4	-.548	-.1260	-.0272	-.0884
10.6	-.532	-.1349	-.0299	-.0931
10.8	-.517	-.1436	-.0327	-.0975
11.0	-.503	-.1520	-.0354	-.1016
11.2	-.490	-.1600	-.0380	-.1055
11.4	-.478	-.1679	-.0406	-.1092
11.6	-.467	-.1757	-.0432	-.1128
11.8	-.456	-.1831	-.0457	-.1161
12.0	-.445	-.1904	-.0482	-.1193
12.2	-.426	-.1974	-.0506	-.1223
12.4	-.427	-.2043	-.0530	-.1252
12.6	-.416	-.2109	-.0553	-.1279
12.8	-.410	-.2175	-.0576	-.1306
13.0	-.402	-.2238	-.0598	-.1331
13.2	-.395	-.2299	-.0619	-.1355
13.4	-.388	-.2359	-.0640	-.1376
13.6	-.381	-.2417	-.0663	-.1400
13.8	-.374	-.2473	-.0681	-.1421
14.0	-.366	-.2530	-.0701	-.1442
14.2	-.362	-.2588	-.0720	-.1361
14.4	-.357	-.2632	-.0737	-.1479

$\alpha_3 = 1.90$

α_4	LAM 1	LAM 2	LAM 3	LAM 4
8.0	-1.023	.0220	.0000*	.0230
8.2	-1.018	.0175	.0000	.0181
8.4	-.968	.6887+	.0150+	.6431+
8.5	-.946	.1239+	.41208	.1215+
8.6	-.917	-.5444+	-.0237+	-.5220+
8.7	-.893	-.0113	-.0457+	-.0106
8.8	-.871	.0171	-.1187+	-.0150
9.0	-.831	-.0204	-.2475+	-.0284
9.2	-.798	-.0393	-.4100+	-.0343
9.4	-.761	-.0503	-.5975+	-.0424
9.6	-.731	-.0609	-.8046+	-.0500
9.8	-.703	-.0712	-.0103	-.0570
10.0	-.678	-.0811	-.0126	-.0635
10.2	-.654	-.0907	-.0150	-.0695
10.4	-.634	-.1002	-.0175	-.0752
10.6	-.614	-.1093	-.0200	-.0805
10.8	-.595	-.1183	-.0226	-.0855
11.0	-.578	-.1269	-.0251	-.0902
11.2	-.562	-.1355	-.0277	-.0947
11.4	-.547	-.1437	-.0302	-.0989
11.6	-.533	-.1515	-.0327	-.1028
11.8	-.520	-.1594	-.0352	-.1066
12.0	-.508	-.1665	-.0375	-.1100
12.2	-.495	-.1742	-.0401	-.1135
12.4	-.485	-.1811	-.0423	-.1166
12.6	-.474	-.1883	-.0448	-.1198
12.8	-.464	-.1950	-.0471	-.1227
13.0	-.455	-.2015	-.0493	-.1255
13.2	-.446	-.2080	-.0515	-.1282+
13.4	-.437	-.2142	-.0537	-.1307
13.6	-.429	-.2203	-.0558	-.1332
13.8	-.421	-.2262	-.0579	-.1355
14.0	-.414	-.2320	-.0599	-.1378
14.2	-.407	-.2376	-.0619	-.1399
14.4	-.400	-.2431	-.0638	-.1420
14.6	-.394	-.2485	-.0657	-.1440
14.8	-.388	-.2537	-.0676	-.1459
15.0	-.382	-.2589	-.0694	-.1476
15.2	-.376	-.2636	-.0711	-.1495

$\alpha_3 = 2.00$

α_4	LAM 1	LAM 2	LAM 3	LAM 4
8.6	-1.009	.8397+	.0000*	.6541+
8.8	-1.004	.4147+	.0000+	.0182+
8.9	-1.002	.2061+	.000198	.2070+
9.0	-.993	-.1081+	-.06078	-.1076+
9.1	-.978	-.5479+	-.70758	-.5567+
9.2	-.950	-.0113	-.0272+	-.0109
9.3	-.905	-.0222	-.1012+	-.0207
9.4	-.865	-.0331	-.2125+	-.0298
9.6	-.828	-.0439	-.3537+	-.0381
9.8	-.796	-.0530	-.5187+	-.0450
10.0	-.796	-.0530	-.5187+	-.0450
10.2	-.766	-.0637	-.7037+	-.0529
10.4	-.736	-.0734	-.9016+	-.0595
10.6	-.713	-.0829	-.0111	-.0657
10.8	-.690	-.0920	-.0123	-.0710
11.0	-.670	-.1005	-.0152	-.0766
11.2	-.647	-.1091	-.0179	-.0813
11.4	-.629	-.1181	-.0202	-.0867
11.6	-.611	-.1264	-.0226	-.0912
11.8	-.595	-.1345	-.0249	-.0955
12.0	-.579	-.1423	-.0273	-.0995
12.2	-.565	-.1498	-.0295	-.1031
12.4	-.557	-.1555	-.0312	-.1062
12.6	-.539	-.1644	-.0342	-.1108
12.8	-.527	-.1715	-.0365	-.1137
13.0	-.515	-.1784	-.0388	-.1168
13.2	-.504	-.1851	-.0410	-.1196
13.4	-.495	-.1914	-.0431	-.1226
13.6	-.485	-.1979	-.0453	-.1254
13.8	-.475	-.2041	-.0474	-.1280
14.0	-.466	-.2101	-.0495	-.1305
14.2	-.458	-.2160	-.0515	-.1329
14.4	-.450	-.2215	-.0535	-.1351
14.6	-.443	-.2271	-.0554	-.1373
14.8	-.436	-.2321	-.0571	-.1393
15.0	-.428	-.2380	-.0592	-.1415
15.2	-.422	-.2432	-.0610	-.1435*
15.4	-.415	-.2481	-.0628	-.1453*
15.6	-.409	-.2532	-.0646	-.1473
15.8	-.403	-.2580	-.0663	-.1488*

ประวัติผู้วิจัย

        นางสาวกมลทิพย์ ปรัชญชรินกร เกิดวันที่ 15 ตุลาคม พ.ศ. 2516 สำเร็จการศึกษาปริญญาวิทยาศาสตรบัณฑิต (วท.บ) สาขาสถิติ ภาควิชาสถิติ คณะวิทยาศาสตร์ จากมหาวิทยาลัยเชียงใหม่ ในปีการศึกษา 2537 และเข้าศึกษาต่อในหลักสูตรสถิติศาสตรมหาบัณฑิต ภาควิชาสถิติ คณะพาณิชยศาสตร์และการบัญชี จุฬาลงกรณ์มหาวิทยาลัย ในปีการศึกษา 2539