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ภาคผนวก

ภาคผนวก ก.

ตารางที่ ก. ตารางสรุปผลขนาดตัวอย่าง n อย่างน้อยที่สุดที่ควรใช้ในการประมาณการแจกแจงของตัวสถิติทดสอบที จำแนกตามสัมประสิทธิ์ความเบ้ α_3 สัมประสิทธิ์ความโด่ง α_4 และระดับนัยสำคัญ α = 0.01

α_4 \ α_3	[0.0,0.2]	(0.2,0.4]	(0.4,0.6]	(0.6,0.8]	(0.8,1.0]	(1.0,1.1]	(1.1,1.2]	(1.2,1.3]	(1.3,1.4]	(1.4,1.5]	(1.5,1.6]	(1.6,1.7]	(1.7,1.8]	(1.8,1.9]	(1.9,2.0]
[1.8,2.2]	27	30													
(2.2,2.6]	24	29	32												
(2.6,3.0]	18	28	30	35											
(3.0,3.4]	14	25	28	32	36										
(3.4,3.8]	13	24	27	30	36	39									
(3.8,4.2]	11	22	25	29	35	38	43								
(4.2,4.6]	10	21	24	28	32	37	41	45							
(4.6,5.0]	9	17	22	27	31	36	40	45	48						
(5.0,5.4]	9	15	19	24	30	35	39	43	48	55					
(5.4,5.8]	8	12	17	23	29	34	38	41	47	54					
(5.8,6.2]	8	11	16	21	28	32	37	40	45	54	62				
(6.2,6.6]	7	10	15	20	28	30	35	39	42	51	61	70			
(6.6,7.0]	7	8	13	18	26	29	34	37	41	50	60	69			
(7.0,7.4]	6	7	12	17	25	27	30	36	38	50	59	66	72		
(7.4,7.8]	6	7	11	16	24	26	30	35	37	48	57	64	70		
(7.8,8.2]	6	7	11	15	21	25	29	33	36	46	56	63	69	78	
(8.2,8.6]	5	6	10	15	19	22	28	30	35	46	55	62	68	76	84
(8.6,9.0]	5	6	10	14	18	20	27	30	35	44	53	61	68	74	82
(9.0,9.4]	4	5	9	13	17	20	26	28	33	42	49	58	67	72	80
(9.4,9.8]			8	11	15	19	25	29	31	40	47	57	66	71	78
(9.8,10.2]				10	14	18	23	27	29	37	45	54	62	67	75

ตัวอย่างสัญลักษณ์ [1.8,2.2] คือ ค่าที่มากกว่าหรือเท่ากับ 1.8 และน้อยกว่าหรือเท่ากับ 2.2

(2.2,2.6] คือ ค่าที่มากกว่า 2.2 และน้อยกว่าหรือเท่ากับ 2.6

ตารางที่ ก. (ต่อ)

α_4 \ α_3	[0.0,0.2]	(0.2,0.4]	(0.4,0.6]	(0.6,0.8]	(0.8,1.0]	(1.0,1.1]	(1.1,1.2]	(1.2,1.3]	(1.3,1.4]	(1.4,1.5]	(1.5,1.6]	(1.6,1.7]	(1.7,1.8]	(1.8,1.9]	(1.9,2.0]
(10.2,10.6]					13	16	20	26	28	34	43	52	60	65	73
(10.6,11.0]						15	20	25	28	29	40	48	56	62	70
(11.0,11.4]							18	23	27	28	38	47	55	60	68
(11.4,11.8]								22	27	28	37	45	53	59	67
(11.8,12.2]									26	26	35	43	51	57	65
(12.2,12.6]										24	33	42	50	56	65
(12.6,13.0]											30	40	49	55	64
(13.0,13.4]											28	38	48	54	63
(13.4,13.8]												36	43	51	62
(13.8,14.2]													40	49	60
(14.2,14.6]													39	46	56
(14.6,15.0]														45	53
(15.0,15.4]														42	52
(15.4,15.8]															50

ตารางที่ ข. ตารางสรุปผลขนาดตัวอย่าง n อย่างน้อยที่สุดที่ควรใช้ในการประมาณการแจกแจงของตัวสถิติทดสอบที จำแนกตามสัมประสิทธิ์ความเบ้ α_3 สัมประสิทธิ์ความโด่ง α_4 และระดับนัยสำคัญ α = 0.05

α_4 \ α_3	[0.0,0.2]	(0.2,0.4]	(0.4,0.6]	(0.6,0.8]	(0.8,1.0]	(1.0,1.1]	(1.1,1.2]	(1.2,1.3]	(1.3,1.4]	(1.4,1.5]	(1.5,1.6]	(1.6,1.7]	(1.7,1.8]	(1.8,1.9]	(1.9,2.0]
[1.8,2.2]	27	30													
(2.2,2.6]	24	30	34												
(2.6,3.0]	23	28	32	37											
(3.0,3.4]	20	26	31	36	38										
(3.4,3.8]	18	25	28	32	38	41									
(3.8,4.2]	16	23	26	30	37	41	43								
(4.2,4.6]	15	21	25	30	35	39	42	47							
(4.6,5.0]	14	19	24	29	33	38	41	46	51						
(5.0,5.4]	14	18	23	28	32	36	40	45	50	57					
(5.4,5.8]	13	18	22	26	30	35	38	43	48	57					
(5.8,6.2]	12	17	20	24	28	34	36	40	45	55	66				
(6.2,6.6]	12	14	18	22	27	32	35	39	43	53	65	72			
(6.6,7.0]	11	14	17	20	26	30	34	37	41	51	64	70			
(7.0,7.4]	11	12	15	19	25	29	31	36	40	50	63	69	74		
(7.4,7.8]	10	10	13	17	25	27	30	35	40	48	62	68	73		
(7.8,8.2]	8	10	13	16	22	25	30	34	38	46	60	66	72	79	
(8.2,8.6]	7	9	12	15	21	24	29	33	36	45	58	65	71	78	86
(8.6,9.0]	6	9	12	15	20	24	29	31	35	43	55	62	68	74	83
(9.0,9.4]	5	8	11	14	19	22	27	30	33	42	50	59	67	73	81
(9.4,9.8]			10	14	19	21	25	29	31	39	47	57	65	71	79
(9.8,10.2]				13	18	20	22	29	30	37	44	55	62	68	76

ตัวอย่างสัญลักษณ์ [1.8,2.2] คือ ค่าที่มากกว่าหรือเท่ากับ 1.8 และน้อยกว่าหรือเท่ากับ 2.2

(2.2,2.6] คือ ค่าที่มากกว่า 2.2 และน้อยกว่าหรือเท่ากับ 2.6

ตารางที่ ข. (ต่อ)

α_4 \ α_3	[0.0,0.2]	(0.2,0.4]	(0.4,0.6]	(0.6,0.8]	(0.8,1.0]	(1.0,1.1]	(1.1,1.2]	(1.2,1.3]	(1.3,1.4]	(1.4,1.5]	(1.5,1.6]	(1.6,1.7]	(1.7,1.8]	(1.8,1.9]	(1.9,2.0]
(10.2,10.6]					18	18	21	28	30	36	43	52	60	66	75
(10.6,11.0]						17	20	25	30	36	40	49	57	64	73
(11.0,11.4]							19	25	29	33	39	48	56	63	72
(11.4,11.8]								23	29	33	38	47	56	62	70
(11.8,12.2]									29	32	37	45	53	60	69
(12.2,12.6]										30	35	43	50	57	67
(12.6,13.0]											34	42	49	56	65
(13.0,13.4]											32	40	48	55	64
(13.4,13.8]												38	45	52	61
(13.8,14.2]													44	51	60
(14.2,14.6]													43	50	59
(14.6,15.0]														47	57
(15.0,15.4]														47	55
(15.4,15.8]															54

ตารางที่ ค. ตารางสรุปผลขนาดตัวอย่าง n อย่างน้อยที่สุดที่ควรใช้ในการประมาณการแจกแจงของตัวสถิติทดสอบที จำแนกตามสัมประสิทธิ์ความเบ้ α_3 สัมประสิทธิ์ความโด่ง α_4 และระดับนัยสำคัญ α = 0.10

α_4 \ α_3	[0.0,0.2]	(0.2,0.4]	(0.4,0.6]	(0.6,0.8]	(0.8,1.0]	(1.0,1.1]	(1.1,1.2]	(1.2,1.3]	(1.3,1.4]	(1.4,1.5]	(1.5,1.6]	(1.6,1.7]	(1.7,1.8]	(1.8,1.9]	(1.9,2.0]
[1.8,2.2]	28	31													
(2.2,2.6]	24	31	36												
(2.6,3.0]	23	30	33	37											
(3.0,3.4]	22	28	31	37	42										
(3.4,3.8]	21	27	30	33	41	43									
(3.8,4.2]	20	26	28	30	40	42	48								
(4.2,4.6]	19	24	27	30	37	40	47	49							
(4.6,5.0]	19	22	25	29	35	39	46	49	55						
(5.0,5.4]	19	19	24	29	33	38	44	46	52	58					
(5.4,5.8]	18	19	23	28	30	36	41	45	50	57					
(5.8,6.2]	17	18	22	26	30	35	40	43	48	56	67				
(6.2,6.6]	17	18	20	23	28	35	37	41	46	54	66	73			
(6.6,7.0]	16	17	19	22	28	32	36	39	44	52	65	72			
(7.0,7.4]	16	16	18	21	26	30	36	37	42	50	64	70	75		
(7.4,7.8]	15	16	18	20	25	29	33	36	39	49	62	68	73		
(7.8,8.2]	15	15	17	19	24	27	33	35	38	49	61	67	72	80	
(8.2,8.6]	14	15	16	18	23	26	31	33	37	47	59	65	71	78	87
(8.6,9.0]	13	15	16	17	21	25	31	32	37	44	58	64	70	76	85
(9.0,9.4]	12	13	15	17	21	23	28	31	35	44	55	62	69	75	84
(9.4,9.8]			13	15	20	22	28	30	34	41	51	59	67	73	81
(9.8,10.2]				15	20	21	26	29	33	39	47	57	66	71	78

ตัวอย่างสัญลักษณ์ [1.8,2.2] คือ ค่าที่มากกว่าหรือเท่ากับ 1.8 และน้อยกว่าหรือเท่ากับ 2.2

(2.2,2.6] คือ ค่าที่มากกว่า 2.2 และน้อยกว่าหรือเท่ากับ 2.6

ตารางที่ ก. (ต่อ)

α_4 \ α_3	[0.0,0.2]	(0.2,0.4]	(0.4,0.6]	(0.6,0.8]	(0.8,1.0]	(1.0,1.1]	(1.1,1.2]	(1.2,1.3]	(1.3,1.4]	(1.4,1.5]	(1.5,1.6]	(1.6,1.7]	(1.7,1.8]	(1.8,1.9]	(1.9,2.0]
(10.2,10.6]					19	19	24	28	31	38	46	55	63	69	77
(10.6,11.0]						17	22	27	32	38	42	52	61	67	75
(11.0,11.4]							21	25	32	38	41	51	60	65	73
(11.4,11.8]								25	30	35	40	49	58	63	71
(11.8,12.2]									29	34	38	46	53	60	70
(12.2,12.6]										31	36	44	51	58	67
(12.6,13.0]											34	42	50	56	65
(13.0,13.4]											33	41	48	55	64
(13.4,13.8]												39	47	54	63
(13.8,14.2]													46	51	59
(14.2,14.6]													43	50	59
(14.6,15.0]														49	57
(15.0,15.4]														48	57
(15.4,15.8]															55

ภาคผนวก ข.

โปรแกรมที่ใช้ในการวิจัยครั้งนี้ เพื่อประมาณการประมาณการแจกแจงของตัวสถิติทดสอบทีที่ใช้สำหรับการทดสอบสมมติฐานเกี่ยวกับค่าเฉลี่ย เมื่อประชากรมีการแจกแจงต่าง ๆ ดังนี้

1. การประมาณการแจกแจงของตัวสถิติทดสอบที เมื่อประชากรมีการแจกแจงเอกรูป
   - 1.1 โปรแกรมหาขนาดตัวอย่าง n อย่างน้อยที่สุดที่ควรใช้ในการประมาณ
   - 1.2 โปรแกรมทดสอบเทียบความกลมกลืนกัน

2. การประมาณการแจกแจงของตัวสถิติทดสอบที เมื่อประชากรมีการแจกแจงโลจิสติค
   - 2.1 โปรแกรมหาขนาดตัวอย่าง n อย่างน้อยที่สุดที่ควรใช้ในการประมาณ
   - 2.2 โปรแกรมทดสอบเทียบความกลมกลืนกัน

3. การประมาณการแจกแจงของตัวสถิติทดสอบที เมื่อประชากรมีการแจกแจงที
   - 3.1 โปรแกรมหาขนาดตัวอย่าง n อย่างน้อยที่สุดที่ควรใช้ในการประมาณ
   - 3.2 โปรแกรมทดสอบเทียบความกลมกลืนกัน

4. การประมาณการแจกแจงของตัวสถิติทดสอบทีเมื่อประชากรมีการแจกแจงไคกำลังสอง
   - 4.1 โปรแกรมหาขนาดตัวอย่าง n อย่างน้อยที่สุดที่ควรใช้ในการประมาณ
   - 4.2 โปรแกรมทดสอบเทียบความกลมกลืนกัน

5. การประมาณการแจกแจงของตัวสถิติทดสอบทีเมื่อประชากรมีการแจกแจงลอกนอร์มัล
   - 5.1 โปรแกรมหาขนาดตัวอย่าง n อย่างน้อยที่สุดที่ควรใช้ในการประมาณ
   - 5.2 โปรแกรมทดสอบเทียบความกลมกลืนกัน

6. การประมาณการแจกแจงของตัวสถิติทดสอบที เมื่อประชากรมีการแจกแจงแกมดาของตูร์กี
   - 6.1 โปรแกรมหาขนาดตัวอย่าง n อย่างน้อยที่สุดที่ควรใช้ในการประมาณ
   - 6.2 โปรแกรมทดสอบเทียบความกลมกลืนกัน

1. การประมาณการแจกแจงของตัวสถิติทดสอบที่ที่ใช้สำหรับการทดสอบสมมติฐานเกี่ยวกับค่าเฉลี่ย กรณีที่ตัวอย่างสุ่มมาจากประชากรที่มีการแจกแจงเอกรูป

1.1 โปรแกรมหาขนาดตัวอย่าง n อย่างน้อยที่สุดที่ควรใช้ในการประมาณ

```
C*************************************************************************
C*    THIS PROGRAM IS FIND MINIMUM SAMPLE SIZE FOR  APPROXIMATE        *
C*                        DISTRIBUTION OF T-STATISTIC                  *
C*                  WHEN POPULATION IS UNIFORM  DISTRIBUTION           *
C*                     ALFA - TYPE I ERROR = 0.01, 0.05 AND 0.10       *
C*                     N      - SAMPLE SIZE                            *
C*************************************************************************
C
                  DIMENSION Y(200),T01(200),T05(200),T10(200)
                  INTEGER COUNT
                  REAL LL,LP05,LU05,EX
C
                  READ(5,10) IX
                  READ(5,11) IN
                  READ(5,12) N
                  READ(5,13) A
                  READ(5,14) B
                  READ(5,15) ALFA
            10    FORMAT(I6)
            11    FORMAT(I5)
            12    FORMAT(I4)
            13    FORMAT(F8.4)
            14    FORMAT(F8.4)
            15    FORMAT(F5.3)
                  EX=(A+B)/2
          1000    COUNT = 0
C
                  DO 999 I=1,IN
                  DO 888 J=1,N
```

```
      Y(J) = AUN(A,B,IX)
888   CONTINUE
      TTEST = T(Y,EX,N)
      TCAL = ABS(TTEST)
      IF (ALPA.EQ.0.01) THEN
      IF (TCAL.GE.T01(N-1)) COUNT = COUNT+1
      ELSE  IF (ALPA.EQ.0.05) THEN
      IF (TCAL.GE.T05(N-1)) COUNT = COUNT+1
      ELSE
      IF (TCAL.GE.T10(N-1)) COUNT = COUNT+1
      END IF
999   CONTINUE
      SCOUNT = (COUNT*1.0)/IN
      LL = (ALPA*(1.0-ALPA))/IN
      LP05 = ALPHA+(1.645*SQRT(LL))
      LU05 = 0.0
      NDOIT = 0
      IF((SCOUNT.GT.LU05).AND.(SCOUNT.LT.LP05)) THEN
      WRITE(6,32) N,ALPA
 32   FORMAT(/3X,'SAMPLE SIZE : N = ',I4,5X,'SCOUNT INSIDE
      *AT ALPA = ',F5.3)
      ELSE
      WRITE(6,33) N,ALPA
 33   FORMAT(/3X,'SAMPLE SIZE : N = ',I4,5X,'SCOUNT OUTSIDE
      *AT ALPA = ',F5.3)
      NDOIT = 1
      END IF
      IF (NDOIT.EQ.1) THEN
      N=N+1
      GO TO 1000
      ELSE
      GO TO 9999
      END IF
9999  STOP
      END
```

```
      FUNCTION T(Y,EX,N)
      DIMENSION Y(N)
      REAL EX
      SUMY = 0
      SSUMY = 0
      DO 15 I=1,N
      SUMY = SUMY + Y(I)
      SSUMY = SSUMY + Y(I)**2
15    CONTINUE
      YBAR = SUMY/N
      YYBAR = YBAR**2
      SD = SQRT(SSUMY/N - YYBAR)
      T = (YBAR-EX)*SQRT(N)/SD
      RETURN
      END
C
      FUNCTION AUN(A,B,IX)
      REAL A,B
      IF (A.LE.B) THEN
      AUN = A + (B-A)*ARAND(IX)
      ELSE
      AUN = -99999
      ENDIF
      RETURN
      END
C
      FUNCTION ARAND(IX)
      INTEGER IX
      IX = IX*65539
      IF(IX.LT.0) IX = 1+(IX+2147483647)
      ARAND = IX
      ARAND = ARAND*0.465661287E-9
      RETURN
      END
```

1.2 โปรแกรมทดสอบเทียบความกลมกลืนกัน

```
C*************************************************************************
C*        TEST GOODNESS OF FIT BY KOLMOGOROV-SMIRNOV TEST                *
C*              APPROXIMATE   DISTRIBUTION OF T-STATISTIC                *
C*              WHEN POPULATION IS UNIFORM  DISTRIBUTION                 *
C*************************************************************************
C
              DIMENSION YY(100),AP(100),AG(100),PP(100)
              DIMENSION GG(100),Y(200),FF(100)
              INTEGER K,NN,NI,COUNT
              REAL EX
C
              K=20
              LOOP=200
              READ(5,20) IX
              READ(5,21) A
              READ(5,22) B
              READ(5,23) N
              READ(5,24) NCHECK
        20    FORMAT(I8)
        21    FORMAT(F7.4)
        22    FORMAT(F7.4)
        23    FORMAT(I4)
        24    FORMAT(I1)
              EX=(A+B)/2
              COUNT=0
              DO 666 II=1,LOOP
              DO 888 I=1,K
              NN=I
              AP(I)=FLOAT(NN)/FLOAT(K)
              AG(I)=FLOAT(NN-1)/FLOAT(K)
        888   CONTINUE
              NI=1
        1000  DO 999 J=1,N
```

```
            Y(J) = AUN(A,B,IX)
      999   CONTINUE
            YY(NI) = T(Y,EX,N)
            IF (NCHECK.EQ.0) FF(NI)=DFT_ODD(YY,NI,N)
            IF (NCHECK.EQ.1) FF(NI)=DFT_EVEN(YY,NI,N)
            IF ((FF(NI).LT.0.0).OR.(FF(NI).GT.1.0)) GO TO 1000
            NI=NI+1
            IF (NI.GT.K) GO TO 777
            GO TO 1000
      777   CALL SORT(YY,FF,K)
C
C**********KOLMOGOROV SMIRNOV TEST (D)**************
C
            DO 370 I=1,K
            PP(I)=AP(I)-FF(I)
            GG(I)=FF(I)-AG(I)
            WRITE(6,17) I,YY(I),AP(I),AG(I),FF(I),PP(I),GG(I)
      17    FORMAT(3X,'I= ',I2,2X,'YY=',F6.3,2X,'AP=',F5.3,2X,'AG=',
            *F5.3,2X,'FF=',F6.3,2X,'PP=',F6.3,2X,'GG=',F6.3)
      370   CONTINUE
            I=1
            MP=PP(I)
            DO 100 I=2,K
            IF (MP.LT.PP(I)) MP=PP(I)
      100   CONTINUE
            I=1
            MG=GG(I)
            DO 101 I=2,K
            IF (MG.LT.GG(I)) MG=GG(I)
      101   CONTINUE
            IF(MP-MG) 400,400,410
      400   D = MG
            GOTO 420
      410   D = MP
            DCRIT=0.24
```

```
420     IF(D.LT.DCRIT) THEN
        COUNT=COUNT+1
        WRITE(6,430)
430     FORMAT(5X,'ACCEPT HYPOTHESIS')
        ELSE
        WRITE(6,440)
440     FORMAT(5X,'REJECT HYPOTHESIS')
        END IF
666     CONTINUE
        WRITE(6,450) COUNT
450     FORMAT(//5X,'COUNT ACCEPT = ',I4)
        STOP
        END
C
        REAL FUNCTION T(Y,EX,N)
        DIMENSION Y(N)
        REAL EX
        SUMY = 0
        SSUMY = 0
        DO 15 I=1,N
        SUMY = SUMY + Y(I)
        SSUMY = SSUMY + Y(I)**2
15      CONTINUE
        YBAR = SUMY/N
        YYBAR = YBAR**2
        SD = SQRT(SSUMY/N - YYBAR)
        T = (YBAR-EX)*SQRT(N)/SD
        RETURN
        END
C
        REAL FUNCTION AUN(A,B,IX)
        REAL A,B
        IF (A.LE.B) THEN
        AUN = A + (B-A)*ARAND(IX)
        ELSE
```

```
      AUN = -99999
      ENDIF
      RETURN
      END
C
      REAL FUNCTION ARAND(IX)
      INTEGER IX
      IX = IX*65539
      IF(IX.LT.0) IX = 1+(IX+2147483647)
      ARAND = IX
      ARAND = ARAND*0.465661287E-9
      RETURN
      END
C
      SUBROUTINE SORT(YY,FF,K)
      DIMENSION YY(100),FF(100)
      REAL SAVE,SAVE1
      INTEGER M
      M=K-1
      DO 5 I=1,M
      L=K-1
      DO 5 J=1,L
      IF(YY(J)-YY(J+1)) 5,5,15
15    SAVE=YY(J)
      SAVE1=FF(J)
      YY(J)=YY(J+1)
      FF(J)=FF(J+1)
      YY(J+1)=SAVE
      FF(J+1)=SAVE1
5     CONTINUE
      RETURN
      END
C
      REAL FUNCTION DFT_ODD(YY,I,N)
      DIMENSION YY(100),AA(100),TAA(100)
```

```
      INTEGER NO
      TA = YY(I)/SQRT(N-1)
      TA1 = ATAN(TA)
      TA2 = (YY(I)*SQRT(N-1))/((N-1)+YY(I)**2)
      A0 = 1.0
      AA(1) = 0.66667
      TAA(1) = AA(1)/(1+(YY(I)**2)/(N-1))
      SUMA = A0+TAA(1)
      NO = INT(((N-1)-3)/2)
      DO 555 J=2,3
      AA(J) = (FLOAT(2*J)/FLOAT((2*J)+1))*AA(J-1)
      TAA(J) = AA(J)/((1+(YY(I)**2)/(N-1))**J)
      SUMA = SUMA+TAA(J)
555   CONTINUE
      DFT_ODD = 0.5+TA1+(TA2*SUMA)
      RETURN
      END
C
      REAL FUNCTION DFT_EVEN(YY,I,N)
      DIMENSION YY(100),BB(100),TBB(100)
      TB1 = YY(I)/SQRT(2*((N-1)+YY(I)**2))
      B0 = 1.0
      BB(1) = 0.5
      TBB(1) = BB(1)/(1+((YY(I)**2)/(N-1)))
      SUMB = B0+TBB(1)
      NO = INT(((N-1)-2)/2)
      DO 666 J=2,NO
      BB(J) = (FLOAT((2*J)-1)/FLOAT(2*J))*BB(J-1)
      TBB(J) = BB(J)/((1+((YY(I)**2)/(N-1)))**J)
      SUMB = SUMB+TBB(J)
666   CONTINUE
      DFT_EVEN = 0.5+(TB1*SUMB)
      RETURN
      END
```

2. การประมาณการแจกแจงของตัวสถิติทดสอบที่ที่ใช้สำหรับการทดสอบสมมติฐานเกี่ยวกับค่าเฉลี่ย กรณีที่ตัวอย่างสุ่มมาจากประชากรที่มีการแจกแจงโลจิสติค

2.1 โปรแกรมหาขนาดตัวอย่าง n อย่างน้อยที่สุดที่ควรใช้ในการประมาณ

```
C*************************************************************************
C*    THIS PROGRAM IS FIND MINIMUM SAMPLE SIZE FOR  APPROXIMATE        *
C*                      DISTRIBUTION OF T-STATISTIC                    *
C*            WHEN POPULATION IS LOGISTIC DISTRIBUTION                 *
C*                  ALFA - TYPE I ERROR = 0.01, 0.05 AND 0.10          *
C*                  N      - SAMPLE SIZE                               *
C*************************************************************************
C
                  DIMENSION Y(200),T01(200),T05(200),T10(200)
                  INTEGER COUNT
                  REAL LL,LP05,LU05,EX
C
                  READ(5,10) IX
                  READ(5,11) IN
                  READ(5,12) N
                  READ(5,13) A
                  READ(5,14) B
                  READ(5,15) ALFA
        10        FORMAT(I6)
        11        FORMAT(I5)
        12        FORMAT(I4)
        13        FORMAT(F8.4)
        14        FORMAT(F8.4)
        15        FORMAT(F5.3)
                  EX=A
        1000      COUNT = 0
C
                  DO 999 I=1,IN
                  DO 888 J=1,N
```

```
      Y(J) = ALOGIS(A,B,IX)
888   CONTINUE
      TTEST = T(Y,EX,N)
      TCAL = ABS(TTEST)
      IF (ALFA.EQ.0.01) THEN
      IF (TCAL.GE.T01(N-1)) COUNT = COUNT+1
      ELSE  IF (ALFA.EQ.0.05) THEN
      IF (TCAL.GE.T05(N-1)) COUNT = COUNT+1
      ELSE
      IF (TCAL.GE.T10(N-1)) COUNT = COUNT+1
      END IF
999   CONTINUE
      SCOUNT = (COUNT*1.0)/IN
      LL = (ALFA*(1.0-ALFA))/IN
      LP05 = ALPHA+(1.645*SQRT(LL))
      LU05 = 0.0
      NDOIT = 0
      IF((SCOUNT.GT.LU05).AND.(SCOUNT.LT.LP05)) THEN
      WRITE(6,32) N,ALFA
 32   FORMAT(/3X,'SAMPLE SIZE : N = ',I4,5X,'SCOUNT INSIDE
      *AT ALFA = ',F5.3)
      ELSE
      WRITE(6,33) N,ALFA
 33   FORMAT(/3X,'SAMPLE SIZE : N = ',I4,5X,'SCOUNT OUTSIDE
      *AT ALFA = ',F5.3)
      NDOIT = 1
      END IF
      IF (NDOIT.EQ.1) THEN
      N=N+1
      GO TO 1000
      ELSE
      GO TO 9999
      END IF
9999  STOP
      END
```

```
      FUNCTION T(Y,EX,N)
      DIMENSION Y(N)
      REAL EX
      SUMY = 0
      SSUMY = 0
      DO 15 I=1,N
      SUMY = SUMY + Y(I)
      SSUMY = SSUMY + Y(I)**2
15    CONTINUE
      YBAR = SUMY/N
      YBAR = YBAR**2
      SD = SQRT(SSUMY/N - YYBAR)
      T = (YBAR-EX)*SQRT(N)/SD
      RETURN
      END
C
      FUNCTION ALOGIS(A,B,IX)
      REAL A,B
111   R = ARAND(IX)
      IF ((R.LE.0).OR..(R.GE.1.0)) GO TO 111
      ALOGIS = -B*(ALOG(1-R) - ALOG(R)) + A
      RETURN
      END
C
      FUNCTION ARAND(IX)
      INTEGER IX
      IX = IX*65539
      IF(IX.LT.0) IX = 1+(IX+2147483647)
      ARAND = IX
      ARAND = ARAND*0.465661287E-9
      RETURN
      END
```

2.2 โปรแกรมทดสอบเทียบความกลมกลืนกัน

```
C*************************************************************************
C*        TEST GOODNESS OF FIT BY KOLMOGOROV-SMIRNOV TEST                *
C*              APPROXIMATE   DISTRIBUTION OF T-STATISTIC                *
C*              WHEN POPULATION IS LOGISTIC  DISTRIBUTION                *
C*************************************************************************
C
              DIMENSION YY(100),AP(100),AG(100),PP(100)
              DIMENSION GG(100),Y(200),FF(100)
              INTEGER K,NN,NI,COUNT
              REAL EX
C
              K=20
              LOOP=200
              READ(5,20) IX
              READ(5,21) A
              READ(5,22) B
              READ(5,23) N
              READ(5,24) NCHECK
        20    FORMAT(I8)
        21    FORMAT(F7.4)
        22    FORMAT(F7.4)
        23    FORMAT(I4)
        24    FORMAT(I1)
              EX=A
              COUNT=0
              DO 666 II=1,LOOP
              DO 888 I=1,K
              NN=I
              AP(I)=FLOAT(NN)/FLOAT(K)
              AG(I)=FLOAT(NN-1)/FLOAT(K)
       888    CONTINUE
              NI=1
      1000    DO 999 J=1,N
```

```
            Y(J) = ALOGIS(A,B,IX)
      999   CONTINUE
            YY(NI) = T(Y,EX,N)
            IF (NCHECK.EQ.0) FF(NI)=DFT_ODD(YY,NI,N)
            IF (NCHECK.EQ.1) FF(NI)=DFT_EVEN(YY,NI,N)
            IF ((FF(NI).LT.0.0).OR.(FF(NI).GT.1.0)) GO TO 1000
            NI=NI+1
            IF (NI.GT.K) GO TO 777
            GO TO 1000
      777   CALL SORT(YY,FF,K)
C
C**********KOLMOGOROV SMIRNOV TEST (D)**************
C
            DO 370 I=1,K
            PP(I)=AP(I)-FF(I)
            GG(I)=FF(I)-AG(I)
            WRITE(6,17) I,YY(I),AP(I),AG(I),FF(I),PP(I),GG(I)
      17    FORMAT(3X,'I= ',I2,2X,'YY=',F6.3,2X,'AP=',F5.3,2X,'AG=',
            *F5.3,2X,'FF=',F6.3,2X,'PP=',F6.3,2X,'GG=',F6.3)
      370   CONTINUE
C
            I=1
            MP=PP(I)
            DO 100 I=2,K
            IF (MP.LT.PP(I)) MP=PP(I)
      100   CONTINUE
            I=1
            MG=GG(I)
            DO 101 I=2,K
            IF (MG.LT.GG(I)) MG=GG(I)
      101   CONTINUE
            IF(MP-MG) 400,400,410
      400   D = MG
            GOTO 420
      410   D = MP
```

```
      DCRIT=0.24
420   IF(D.LT.DCRIT) THEN
      COUNT=COUNT+1
      WRITE(6,430)
430   FORMAT(5X,'ACCEPT HYPOTHESIS')
      ELSE
      WRITE(6,440)
440   FORMAT(5X,'REJECT HYPOTHESIS')
      END IF
666   CONTINUE
      WRITE(6,450) COUNT
450   FORMAT(//5X,'COUNT ACCEPT = ',I4)
      STOP
      END
C
      REAL FUNCTION T(Y,EX,N)
      DIMENSION Y(N)
      REAL EX
      SUMY = 0
      SSUMY = 0
      DO 15 I=1,N
      SUMY = SUMY + Y(I)
      SSUMY = SSUMY + Y(I)**2
15    CONTINUE
      YBAR = SUMY/N
      YYBAR = YBAR**2
      SD = SQRT(SSUMY/N - YYBAR)
      T = (YBAR-EX)*SQRT(N)/SD
      RETURN
      END
C
      FUNCTION ALOGIS(A,B,IX)
      REAL A,B
111   R = ARAND(IX)
      IF ((R.LE.0).OR..(R.GE.1.0)) GO TO 111
```

```
      ALOGIS = -B*(ALOG(1-R) - ALOG(R)) + A
      RETURN
      END
C
      FUNCTION ARAND(IX)
      INTEGER IX
      IX = IX*65539
      IF(IX.LT.0) IX = 1+(IX+2147483647)
      ARAND = IX
      ARAND = ARAND*0.4656612875-9
      RETURN
      END
C
      SUBROUTINE SORT(YY,FF,K)
      DIMENSION YY(100),FF(100)
      REAL SAVE,SAVE1
      INTEGER M
      M=K-1
      DO 5 I=1,M
      L=K-1
      DO 5 J=1,L
      IF(YY(J)-YY(J+1)) 5,5,15
15    SAVE=YY(J)
      SAVE1=FF(J)
      YY(J)=YY(J+1)
      FF(J)=FF(J+1)
      YY(J+1)=SAVE
      FF(J+1)=SAVE1
5     CONTINUE
      RETURN
      END
C
      REAL FUNCTION DFT_ODD(YY,I,N)
      DIMENSION YY(100),AA(100),TAA(100)
      INTEGER NO
```

```
      TA = YY(I)/SQRT(N-1)
      TA1 = ATAN(TA)
      TA2 = (YY(I)*SQRT(N-1))/((N-1)+YY(I)**2)
      A0 = 1.0
      AA(1) = 0.66667
      TAA(1) = AA(1)/(1+(YY(I)**2)/(N-1))
      SUMA = A0+TAA(1)
      NO = INT(((N-1)-3)/2)
      DO 555 J=2,3
      AA(J) = (FLOAT(2*J)/FLOAT((2*J)+1))*AA(J-1)
      TAA(J) = AA(J)/((1+(YY(I)**2)/(N-1))**J)
      SUMA = SUMA+TAA(J)
555   CONTINUE
      DFT_ODD = 0.5+TA1+(TA2*SUMA)
      RETURN
      END
C
      REAL FUNCTION DFT_EVEN(YY,I,N)
      DIMENSION YY(100),BB(100),TBB(100)
      TB1 = YY(I)/SQRT(2*((N-1)+YY(I)**2))
      B0 = 1.0
      BB(1) = 0.5
      TBB(1) = BB(1)/(1+((YY(I)**2)/(N-1)))
      SUMB = B0+TBB(1)
      NO = INT(((N-1)-2)/2)
      DO 666 J=2,NO
      BB(J) = (FLOAT((2*J)-1)/FLOAT(2*J))*BB(J-1)
      TBB(J) = BB(J)/((1+((YY(I)**2)/(N-1)))**J)
      SUMB = SUMB+TBB(J)
666   CONTINUE
      DFT_EVEN = 0.5+(TB1*SUMB)
      RETURN
      END
```

3. การประมาณการแจกแจงของตัวสถิติทดสอบที่ที่ใช้สำหรับการทดสอบสมมติฐานเกี่ยวกับค่าเฉลี่ย กรณีที่ตัวอย่างสุ่มมาจากประชากรที่มีการแจกแจงที

3.1 โปรแกรมหาขนาดตัวอย่าง n อย่างน้อยที่สุดที่ควรใช้ในการประมาณ

```
C*************************************************************************
C*   THIS PROGRAM IS FIND MINIMUM SAMPLE SIZE FOR  APPROXIMATE          *
C*                    DISTRIBUTION OF T-STATISTIC                       *
C*                 WHEN POPULATION IS  T  DISTRIBUTION                  *
C*                 ALFA - TYPE I ERROR = 0.01, 0.05 AND 0.10            *
C*                 N     - SAMPLE SIZE                                  *
C*************************************************************************
C
              DIMENSION Y(200),T01(200),T05(200),T10(200)
              INTEGER COUNT,V
              REAL LL,LP05,LU05,EX
C
              READ(5,10) IX
              READ(5,11) IN
              READ(5,12) N
              READ(5,15) ALFA
              READ(5,17) V
        10    FORMAT(I6)
        11    FORMAT(I5)
        12    FORMAT(I4)
        15    FORMAT(F5.3)
        17    FORMAT(I4)
              EX=0.0
        1000  COUNT = 0
              DO 999 I=1,IN
              DO 888 J=1,N
              Y(J) = ASTUD(V,IX)
        888   CONTINUE
              TTEST = T(Y,EX,N)
```

```
      TCAL = ABS(TTEST)
      IF (ALPA.EQ.0.01) THEN
      IF (TCAL.GE.T01(N-1)) COUNT = COUNT+1
      ELSE  IF (ALPA.EQ.0.05) THEN
      IF (TCAL.GE.T05(N-1)) COUNT = COUNT+1
      ELSE
      IF (TCAL.GE.T10(N-1)) COUNT = COUNT+1
      END IF
999   CONTINUE
      SCOUNT = (COUNT*1.0)/IN
      LL = (ALFA*(1.0-ALFA))/IN
      LP05 = ALPHA+(1.645*SQRT(LL))
      LU05 = 0.0
      NDOIT = 0
      IF((SCOUNT.GT.LU05).AND.(SCOUNT.LT.LP05)) THEN
      WRITE(6,32) N,ALFA
 32   FORMAT(/3X,'SAMPLE SIZE : N = ',I4,5X,'SCOUNT INSIDE
      *AT ALFA = ',F5.3)
      ELSE
      WRITE(6,33) N,ALFA
 33   FORMAT(/3X,'SAMPLE SIZE : N = ',I4,5X,'SCOUNT OUTSIDE
      *AT ALFA = ',F5.3)
      NDOIT = 1
      END IF
      IF (NDOIT.EQ.1) THEN
      N=N+1
      GO TO 1000
      ELSE
      GO TO 9999
      END IF
9999  STOP
      END
C
```

```
      FUNCTION T(Y,EX,N)
      DIMENSION Y(N)
      REAL EX
      SUMY = 0
      SSUMY = 0
      DO 15 I=1,N
      SUMY = SUMY + Y(I)
      SSUMY = SSUMY + Y(I)**2
15    CONTINUE
      YBAR = SUMY/N
      YBAR = YBAR**2
      SD = SQRT(SSUMY/N - YYBAR)
      T = (YBAR-EX)*SQRT(N)/SD
      RETURN
      END
C
      FUNCTION ASTUD(V,DX)
      INTEGER V
      REAL A
      A = ACHI(V,DX)
      ASTUD = ASNORM(DX)/SQRT(A/V)
      RETURN
      END
C
      FUNCTION ACHI(V,DX)
      INTEGER V
      REAL A,B
      A = 0.0
      DO 1 I = 1,V
      B = ASNORM(DX)
1     A = A + B*B
      ACHI = A
      RETURN
      END
```

```
      FUNCTION ASNORM(IX)
      INTEGER*2 K1
      REAL NOR1,NOR2,U1,U2,MPI
      SAVE NOR1,NOR2,K1
      MPI = 3.14159265
      IF (K1.EQ.0) THEN
      U1 = ARAND(IX)
      U2 = ARAND(IX)
      NOR1 = SQRT(-2*LOG(U1))*COS(2*MPI*U2)
      NOR2 = SQRT(-2*LOG(U1))*SIN(2*MPI*U2)
      K1 = 1
      ASNORM = NOR1
      ELSE
      K1 = 0
      ASNORM = NOR2
      ENDIF
      RETURN
      END
C
      FUNCTION ARAND(IX)
      INTEGER IX
      IX = IX*65539
      IF(IX.LT.0) IX = 1+(IX+2147483647)
      ARAND = IX
      ARAND = ARAND*0.4656612873E-9
      RETURN
      END
```

3.2 โปรแกรมทดสอบเทียบความกลมกลืนกัน

```
C*************************************************************************
C*        TEST GOODNESS OF FIT BY KOLMOGOROV-SMIRNOV TEST                *
C*              APPROXIMATE  DISTRIBUTION OF T-STATISTIC                 *
C*                WHEN POPULATION IS T  DISTRIBUTION                     *
C*************************************************************************
C
      DIMENSION YY(100),AP(100),AO(100),PP(100)
      DIMENSION GG(100),Y(200),FF(100)
      INTEGER K,NN,NI,COUNT,V
      REAL EX
C
      K=20
      LOOP=200
      READ(5,20) IX
      READ(5,21) V
      READ(5,23) N
      READ(5,24) NCHECK
   20 FORMAT(I8)
   21 FORMAT(I4)
   23 FORMAT(I4)
   24 FORMAT(I1)
      EX=0.0
      COUNT=0
      DO 666 II=1,LOOP
      DO 888 I=1,K
      NN=I
      AP(I)=FLOAT(NN)/FLOAT(K)
      AO(I)=FLOAT(NN-1)/FLOAT(K)
  888 CONTINUE
      NI=1
 1000 DO 999 J=1,N
      Y(J) = ASTUD(V,IX)
  999 CONTINUE
```

```
              YY(NI) = T(Y,EX,N)
              IF (NCHECK.EQ.0) FF(NI)=DFT_ODD(YY,NI,N)
              IF (NCHECK.EQ.1) FF(NI)=DFT_EVEN(YY,NI,N)
              IF ((FF(NI).LT.0.0).OR.(FF(NI).GT.1.0)) GO TO 1000
              NI=NI+1
              IF (NI.GT.K) GO TO 777
              GO TO 1000
      777     CALL SORT(YY,FF,K)
C
C*********KOLMOGOROV SMIRNOV TEST (D)*************
C
              DO 370 I=1,K
              PP(I)=AP(I)-FF(I)
              GG(I)=FF(I)-AG(I)
              WRITE(6,17) I,YY(I),AP(I),AG(I),FF(I),PP(I),GG(I)
      17      FORMAT(3X,'I= ',I2,2X,'YY=',F6.3,2X,'AP=',F5.3,2X,'AG=',
              *F5.3,2X,'FF=',F6.3,2X,'PP=',F6.3,2X,'GG=',F6.3)
      370     CONTINUE
              I=1
              MP=PP(I)
              DO 100 I=2,K
              IF (MP.LT.PP(I)) MP=PP(I)
      100     CONTINUE
              I=1
              MG=GG(I)
              DO 101 I=2,K
              IF (MG.LT.GG(I)) MG=GG(I)
      101     CONTINUE
              IF(MP-MG) 400,400,410
      400     D = MG
              GOTO 420
      410     D = MP
              DCRIT=0.24
      420     IF(D.LT.DCRIT) THEN
              COUNT=COUNT+1
```

```
      WRITE(6,430)
430   FORMAT(5X,'ACCEPT HYPOTHESIS')
      ELSE
      WRITE(6,440)
440   FORMAT(5X,'REJECT HYPOTHESIS')
      END IF
666   CONTINUE
      WRITE(6,450) COUNT
450   FORMAT(//5X,'COUNT ACCEPT = ',I4)
      STOP
      END
C
      REAL FUNCTION T(Y,EX,N)
      DIMENSION Y(N)
      REAL EX
      SUMY = 0
      SSUMY = 0
      DO 15 I=1,N
      SUMY = SUMY + Y(I)
      SSUMY = SSUMY + Y(I)**2
15    CONTINUE
      YBAR = SUMY/N
      YYBAR = YBAR**2
      SD = SQRT(SSUMY/N - YYBAR)
      T = (YBAR-EX)*SQRT(N)/SD
      RETURN
      END
C
      FUNCTION ASTUD(V,IX)
      INTEGER V
      REAL A
      A = ACHI(V,IX)
      ASTUD = ASNORM(IX)/SQRT(A/V)
      RETURN
      END
```

```
      FUNCTION ACHI(V,IX)
      INTEGER V
      REAL A,B
      A = 0.0
      DO 1 I = 1,V
      B = ASNORM(IX)
1     A = A + B*B
      ACHI = A
      RETURN
      END
C
      FUNCTION ASNORM(IX)
      INTEGER*2 K1
      REAL NOR1,NOR2,U1,U2,MPI
      SAVE NOR1,NOR2,K1
      MPI = 3.14159265
      IF (K1.EQ.0) THEN
      U1 = ARAND(IX)
      U2 = ARAND(IX)
      NOR1 = SQRT(-2*LOG(U1))*COS(2*MPI*U2)
      NOR2 = SQRT(-2*LOG(U1))*SIN(2*MPI*U2)
      K1 = 1
      ASNORM = NOR1
      ELSE
      K1 = 0
      ASNORM = NOR2
      ENDIF
      RETURN
      END
C
      FUNCTION ARAND(IX)
      INTEGER IX
      IX = IX*65539
      IF(IX.LT.0) IX = 1+(IX+2147483647)
      ARAND = IX
```

```
      ARAND = ARAND*0.465661287E-9
      RETURN
      END
C
      SUBROUTINE SORT(YY,FF,K)
      DIMENSION YY(100),FF(100)
      REAL SAVE,SAVE1
      INTEGER M
      M=K-1
      DO 5 I=1,M
      L=K-1
      DO 5 J=1,L
      IF(YY(J)-YY(J+1)) 5,5,15
15    SAVE=YY(J)
      SAVE1=FF(J)
      YY(J)=YY(J+1)
      FF(J)=FF(J+1)
      YY(J+1)=SAVE
      FF(J+1)=SAVE1
5     CONTINUE
      RETURN
      END
C
      REAL FUNCTION DFT_ODD(YY,I,N)
      DIMENSION YY(100),AA(100),TAA(100)
      INTEGER NO
      TA = YY(I)/SQRT(N-1)
      TA1 = ATAN(TA)
      TA2 = (YY(I)*SQRT(N-1))/((N-1)+YY(I)**2)
      A0 = 1.0
      AA(1) = 0.66667
      TAA(1) = AA(1)/(1+(YY(I)**2)/(N-1))
      SUMA = A0+TAA(1)
      NO = INT((N-1)-3)/2)
      DO 555 J=2,3
```

```
      AA(J) = (FLOAT(2*J)/FLOAT((2*J)+1))*AA(J-1)
      TAA(J) = AA(J)/((1+(YY(I)**2)/(N-1))**J)
      SUMA = SUMA+TAA(J)
555   CONTINUE
      DFT_ODD = 0.5+TA1+(TA2*SUMA)
      RETURN
      END
C
      REAL FUNCTION DFT_EVEN(YY,I,N)
      DIMENSION YY(100),BB(100),TBB(100)
      TB1 = YY(I)/SQRT(2*((N-1)+YY(I)**2))
      B0 = 1.0
      BB(1) = 0.5
      TBB(1) = BB(1)/(1+((YY(I)**2)/(N-1)))
      SUMB = B0+TBB(1)
      NO = INT(((N-1)-2)/2)
      DO 666 J=2,NO
      BB(J) = (FLOAT((2*J)-1)/FLOAT(2*J))*BB(J-1)
      TBB(J) = BB(J)/((1+((YY(I)**2)/(N-1)))**J)
      SUMB = SUMB+TBB(J)
666   CONTINUE
      DFT_EVEN = 0.5+(TB1*SUMB)
      RETURN
      END
```

4. การประมาณการแจกแจงของตัวสถิติทดสอบที่ที่ใช้สำหรับการทดสอบสมมติฐานเกี่ยวกับค่าเฉลี่ย กรณีที่ตัวอย่างสุ่มมาจากประชากรที่มีการแจกแจงไคกำลังสอง

4.1 โปรแกรมหาขนาดตัวอย่าง n อย่างน้อยที่สุดที่ควรใช้ในการประมาณ

```
C*************************************************************************
C*   THIS PROGRAM IS FIND MINIMUM SAMPLE SIZE FOR  APPROXIMATE          *
C*                      DISTRIBUTION OF T-STATISTIC                     *
C*            WHEN POPULATION IS  CHI-SQUARE  DISTRIBUTION              *
C*                  ALFA - TYPE I ERROR = 0.01, 0.05 AND 0.10           *
C*                  N      - SAMPLE SIZE                                *
C*************************************************************************
C
                DIMENSION Y(200),T01(200),T05(200),T10(200)
                INTEGER COUNT,V
                REAL LL,LP05,LU05,EX
C
                READ(5,10) IX
                READ(5,11) IN
                READ(5,12) N
                READ(5,15) ALFA
                READ(5,17) V
          10    FORMAT(I6)
          11    FORMAT(I5)
          12    FORMAT(I4)
          15    FORMAT(F5.3)
          17    FORMAT(I4)
                EX=V
          1000  COUNT = 0
                DO 999 I=1,IN
                DO 888 J=1,N
                Y(J) = ACHI(V,IX)
          888   CONTINUE
                TTEST = T(Y,EX,N)
```

```
      TCAL = ABS(TTEST)
      IF (ALFA.EQ.0.01) THEN
      IF (TCAL.GE.T01(N-1)) COUNT = COUNT+1
      ELSE  IF (ALFA.EQ.0.05) THEN
      IF (TCAL.GE.T05(N-1)) COUNT = COUNT+1
      ELSE
      IF (TCAL.GE.T10(N-1)) COUNT = COUNT+1
      END IF
999   CONTINUE
      SCOUNT = (COUNT*1.0)/IN
      LL = (ALFA*(1.0-ALFA))/IN
      LP05 = ALPHA+(1.645*SQRT(LL))
      LU05 = 0.0
      NDOIT = 0
      IF((SCOUNT.GT.LU05).AND.(SCOUNT.LT.LP05)) THEN
      WRITE(6,32) N,ALFA
 32   FORMAT(/3X,'SAMPLE SIZE : N = ',I4,5X,'SCOUNT INSIDE
      *AT ALFA = ',F5.3)
      ELSE
      WRITE(6,33) N,ALFA
 33   FORMAT(/3X,'SAMPLE SIZE : N = ',I4,5X,'SCOUNT OUTSIDE
      *AT ALFA = ',F5.3)
      NDOIT = 1
      END IF
      IF (NDOIT.EQ.1) THEN
      N=N+1
      GO TO 1000
      ELSE
      GO TO 9999
      END IF
9999  STOP
      END
C
```

```
      FUNCTION T(Y,EX,N)
      DIMENSION Y(N)
      REAL EX
      SUMY = 0
      SSUMY = 0
      DO 15 I=1,N
      SUMY = SUMY + Y(I)
      SSUMY = SSUMY + Y(I)**2
15    CONTINUE
      YBAR = SUMY/N
      YBAR = YBAR**2
      SD = SQRT(SSUMY/N - YYBAR)
      T = (YBAR-EX)*SQRT(N)/SD
      RETURN
      END
C
      FUNCTION ACHI(V,IX)
      INTEGER V
      REAL A,B
      A = 0.0
      DO 1 I = 1,V
      B = ASNORM(IX)
1     A = A + B*B
      ACHI = A
      RETURN
      END
C
      FUNCTION ASNORM(IX)
      INTEGER*2 K1
      REAL NOR1,NOR2,U1,U2,MPI
      SAVE NOR1,NOR2,K1
      MPI = 3.14159265
      IF (K1.EQ.0) THEN
      U1 = ARAND(IX)
      U2 = ARAND(IX)
```

```
      NOR1 = SQRT(-2*LOG(U1))*COS(2*MPI*U2)
      NOR2 = SQRT(-2*LOG(U1))*SIN(2*MPI*U2)
      K1 = 1
      ASNORM = NOR1
      ELSE
      K1 = 0
      ASNORM = NOR2
      ENDIF
      RETURN
      END
C
      FUNCTION ARAND(IX)
      INTEGER IX
      IX = IX*65539
      IF(IX.LT.0) IX = 1+(IX+2147483647)
      ARAND = IX
      ARAND = ARAND*0.465661287E-9
      RETURN
      END
```

4.2 โปรแกรมทดสอบเทียบความกลมกลืนกัน

```
C*************************************************************************
C*          TEST GOODNESS OF FIT BY KOLMOGOROV-SMIRNOV TEST              *
C*                APPROXIMATE  DISTRIBUTION OF T-STATISTIC               *
C*              WHEN POPULATION IS CHI-SQUARE  DISTRIBUTION              *
C*************************************************************************
C
                DIMENSION YY(100),AP(100),AG(100),PP(100)
                DIMENSION GG(100),Y(200),FF(100)
                INTEGER K,NN,NI,COUNT,V
                REAL EX
C
                K=20
                LOOP=200
                READ(5,20) IX
                READ(5,21) V
                READ(5,23) N
                READ(5,24) NCHECK
          20    FORMAT(I8)
          21    FORMAT(I4)
          23    FORMAT(I4)
          24    FORMAT(I1)
                EX=V
                COUNT=0
                DO 666 II=1,LOOP
                DO 888 I=1,K
                NN=I
                AP(I)=FLOAT(NN)/FLOAT(K)
                AG(I)=FLOAT(NN-1)/FLOAT(K)
          888   CONTINUE
                NI=1
          1000  DO 999 J=1,N
                Y(J) = ACHI(V,IX)
          999   CONTINUE
```

```
            YY(NI) = T(Y,EX,N)
            IF (NCHECK.EQ.0) FF(NI)=DFT_ODD(YY,NI,N)
            IF (NCHECK.EQ.1) FF(NI)=DFT_EVEN(YY,NI,N)
            IF ((FF(NI).LT.0.0).OR.(FF(NI).GT.1.0)) GO TO 1000
            NI=NI+1
            IF (NI.GT.K) GO TO 777
            GO TO 1000
      777   CALL SORT(YY,FF,K)
C
C**********KOLMOGOROV SMIRNOV TEST (D)**************
C
            DO 370 I=1,K
            PP(I)=AP(I)-FF(I)
            GG(I)=FF(I)-AG(I)
            WRITE(6,17) I,YY(I),AP(I),AG(I),FF(I),PP(I),GG(I)
      17    FORMAT(3X,'I= ',I2,2X,'YY=',F6.3,2X,'AP=',F5.3,2X,'AG=',
           *F5.3,2X,'FF=',F6.3,2X,'PP=',F6.3,2X,'GG=',F6.3)
      370   CONTINUE
C
            I=1
            MP=PP(I)
            DO 100 I=2,K
            IF (MP.LT.PP(I)) MP=PP(I)
      100   CONTINUE
            I=1
            MG=GG(I)
            DO 101 I=2,K
            IF (MG.LT.GG(I)) MG=GG(I)
      101   CONTINUE
            IF(MP-MG) 400,400,410
      400   D = MG
            GOTO 420
      410   D = MP
            DCRIT=0.24
      420   IF(D.LT.DCRIT) THEN
```

```
      COUNT=COUNT+1
      WRITE(6,430)
430   FORMAT(5X,'ACCEPT HYPOTHESIS')
      ELSE
      WRITE(6,440)
440   FORMAT(5X,'REJECT HYPOTHESIS')
      END IF
666   CONTINUE
      WRITE(6,450) COUNT
450   FORMAT(//5X,'COUNT ACCEPT = ',I4)
      STOP
      END
C
      REAL FUNCTION T(Y,EX,N)
      DIMENSION Y(N)
      REAL EX
      SUMY = 0
      SSUMY = 0
      DO 15 I=1,N
      SUMY = SUMY + Y(I)
      SSUMY = SSUMY + Y(I)**2
15    CONTINUE
      YBAR = SUMY/N
      YYBAR = YBAR**2
      SD = SQRT(SSUMY/N - YYBAR)
      T = (YBAR-EX)*SQRT(N)/SD
      RETURN
      END
C
      FUNCTION ACHI(V,IX)
      INTEGER V
      REAL A,B
      A = 0.0
      DO 1 I = 1,V
      B = ASNORM(IX)
```

```
1       A = A + B*B
        ACHI = A
        RETURN
        END
        FUNCTION ASNORM(IX)
        INTEGER*2 K1
        REAL NOR1,NOR2,U1,U2,MPI
        SAVE NOR1,NOR2,K1
        MPI = 3.14159265
        IF (K1.EQ.0) THEN
        U1 = ARAND(IX)
        U2 = ARAND(IX)
        NOR1 = SQRT(-2*LOG(U1))*COS(2*MPI*U2)
        NOR2 = SQRT(-2*LOG(U1))*SIN(2*MPI*U2)
        K1 = 1
        ASNORM = NOR1
        ELSE
        K1 = 0
        ASNORM = NOR2
        ENDIF
        RETURN
        END
C
        FUNCTION ARAND(IX)
        INTEGER IX
        IX = IX*65539
        IF(IX.LT.0) IX = 1+(IX+2147483647)
        ARAND = IX
        ARAND = ARAND*0.465661287E-9
        RETURN
        END
C
        SUBROUTINE SORT(YY,FF,K)
        DIMENSION YY(100),FF(100)
        REAL SAVE,SAVE1
```

```
      INTEGER M
      M=K-1
      DO 5 I=1,M
      L=K-1
      DO 5 J=1,L
      IF(YY(J)-YY(J+1)) 5,5,15
15    SAVE=YY(J)
      SAVE1=FF(J)
      YY(J)=YY(J+1)
      FF(J)=FF(J+1)
      YY(J+1)=SAVE
      FF(J+1)=SAVE1
5     CONTINUE
      RETURN
      END
C
      REAL FUNCTION DFT_ODD(YY,I,N)
      DIMENSION YY(100),AA(100),TAA(100)
      INTEGER NO
      TA = YY(I)/SQRT(N-1)
      TA1 = ATAN(TA)
      TA2 = (YY(I)*SQRT(N-1))/((N-1)+YY(I)**2)
      A0 = 1.0
      AA(1) = 0.66667
      TAA(1) = AA(1)/(1+(YY(I)**2)/(N-1))
      SUMA = A0+TAA(1)
      NO = INT((N-1)-3)/2)
      DO 555 J=2,3
      AA(J) = (FLOAT(2*J)/FLOAT((2*J)+1))*AA(J-1)
      TAA(J) = AA(J)/((1+(YY(I)**2)/(N-1))**J)
      SUMA = SUMA+TAA(J)
555   CONTINUE
      DFT_ODD = 0.5+TA1+(TA2*SUMA)
      RETURN
      END
```

```
      REAL FUNCTION DFT_EVEN(YY,I,N)
      DIMENSION YY(100),BB(100),TBB(100)
      TB1 = YY(I)/SQRT(2*((N-1)+YY(I)**2))
      B0 = 1.0
      BB(1) = 0.5
      TBB(1) = BB(1)/(1+((YY(I)**2)/(N-1)))
      SUMB = B0+TBB(1)
      NO = INT(((N-1)-2)/2)
      DO 666 J=2,NO
      BB(J) = (FLOAT((2*J)-1)/FLOAT(2*J))*BB(J-1)
      TBB(J) = BB(J)/((1+((YY(I)**2)/(N-1)))**J)
      SUMB = SUMB+TBB(J)
666   CONTINUE
      DFT_EVEN = 0.5+(TB1*SUMB)
      RETURN
      END
```

5. การประมาณการแจกแจงของตัวสถิติทดสอบที่ที่ใช้สำหรับการทดสอบสมมติฐานเกี่ยวกับค่าเฉลี่ย กรณีที่ตัวอย่างสุ่มมาจากประชากรที่มีการแจกแจงลอกนอร์มัล

5.1 โปรแกรมหาขนาดตัวอย่าง n อย่างน้อยที่สุดที่ควรใช้ในการประมาณ

```
C*********************************************************************
C*   THIS PROGRAM IS FIND MINIMUM SAMPLE SIZE FOR  APPROXIMATE      *
C*                    DISTRIBUTION OF T-STATISTIC                   *
C*          WHEN POPULATION IS   LOGNORMAL  DISTRIBUTION            *
C*                ALFA - TYPE I ERROR = 0.01, 0.05 AND 0.10         *
C*                N      - SAMPLE SIZE                              *
C*********************************************************************
C
                DIMENSION Y(200),T01(200),T05(200),T10(200)
                INTEGER COUNT
                REAL LL,LP05,LU05,EX
C
                READ(5,10) IX
                READ(5,11) IN
                READ(5,12) N
                READ(5,13) ALFA
                READ(5,14) AMEAN
                READ(5,15) VAR
C
        10      FORMAT(I6)
        11      FORMAT(I5)
        12      FORMAT(I4)
        13      FORMAT(F5.3)
        14      FORMAT(F8.3)
        15      FORMAT(F8.3)
C
                SD = SQRT(VAR)
                EX1=AMEAN+((SD**2)/2)
                EX=EXP(EX1)
```

```
1000    COUNT = 0
        DO 999 I=1,IN
        DO 888 J=1,N
        Y(J) = ALNORM(AMEAN,SD,IX)
888     CONTINUE
        TTEST = T(Y,EX,N)
        TCAL = ABS(TTEST)
        IF (ALFA.EQ.0.01) THEN
        IF (TCAL.GE.T01(N-1)) COUNT = COUNT+1
        ELSE  IF (ALFA.EQ.0.05) THEN
        IF (TCAL.GE.T05(N-1)) COUNT = COUNT+1
        ELSE
        IF (TCAL.GE.T10(N-1)) COUNT = COUNT+1
        END IF
999     CONTINUE
        SCOUNT = (COUNT*1.0)/IN
        LL = (ALFA*(1.0-ALFA))/IN
        LP05 = ALPHA+(1.645*SQRT(LL))
        LU05 = 0.0
        NDOIT = 0
        IF((SCOUNT.GT.LU05).AND.(SCOUNT.LT.LP05)) THEN
        WRITE(6,32) N,ALFA
 32     FORMAT(/3X,'SAMPLE SIZE : N = ',I4,5X,'SCOUNT INSIDE
        *AT ALFA = ',F5.3)
        ELSE
        WRITE(6,33) N,ALFA
 33     FORMAT(/3X,'SAMPLE SIZE : N = ',I4,5X,'SCOUNT OUTSIDE
        *AT ALFA = ',F5.3)
        NDOIT = 1
        END IF
        IF (NDOIT.EQ.1) THEN
        N=N+1
        GO TO 1000
        ELSE
        GO TO 9999
```

```
      END IF

9999  STOP
      END
C
      FUNCTION T(Y,EX,N)
      DIMENSION Y(N)
      REAL EX
      SUMY = 0
      SSUMY = 0
      DO 15 I=1,N
      SUMY = SUMY + Y(I)
      SSUMY = SSUMY + Y(I)**2
15    CONTINUE
      YBAR = SUMY/N
      YBAR = YBAR**2
      SD = SQRT(SSUMY/N - YYBAR)
      T = (YBAR-EX)*SQRT(N)/SD
      RETURN
      END
C
      FUNCTION ALNORM(AMEAN,SD,IX)
      REAL AMEAN,SD,A
      A = ANORM(AMEAN,SD,IX)
      ALNORM = EXP(A)
      RETURN
      END
      FUNCTION ANORM(AMEAN,SD,IX)
      ANORM  = AMEAN + ASNORM(IX)*SD
      RETURN
      END
C
```

```
      REAL FUNCTION ASNORM(IX)
      INTEGER*2 K1
      REAL NOR1,NOR2,U1,U2,MPI
      SAVE NOR1,NOR2,K1
      MPI = 3.14159265
      IF (K1.EQ.0) THEN
      U1 = ARAND(IX)
      U2 = ARAND(IX)
      NOR1 = SQRT(-2*LOG(U1))*COS(2*MPI*U2)
      NOR2 = SQRT(-2*LOG(U1))*SIN(2*MPI*U2)
      K1 = 1
      ASNORM = NOR1
      ELSE
      K1 = 0
      ASNORM = NOR2
      ENDIF
      RETURN
      END
C
      FUNCTION ARAND(IX)
      INTEGER IX
      IX = IX*65539
      IF(IX.LT.0) IX = 1+(IX+2147483647)
      ARAND = IX
      ARAND = ARAND*0.465661287E-9
      RETURN
      END
```

5.2 โปรแกรมทดสอบเทียบความกลมกลืนกัน

```
C*************************************************************************
C*        TEST GOODNESS OF FIT BY KOLMOGOROV-SMIRNOV TEST                *
C*              APPROXIMATE   DISTRIBUTION OF T-STATISTIC                *
C*            WHEN POPULATION IS  LOGNORMAL  DISTRIBUTION                *
C*************************************************************************
C
              DIMENSION YY(100),AP(100),AO(100),PP(100)
              DIMENSION OO(100),Y(200),FF(100)
              INTEGER K,NN,NI,COUNT
              REAL EX
C
              K=20
              LOOP=200
              READ(5,20) IX
              READ(5,21) AMEAN
              READ(5,22) VAR
              READ(5,23) N
              READ(5,24) NCHECK
        20    FORMAT(I8)
        21    FORMAT(F8.3)
        22    FORMAT(F8.3)
        23    FORMAT(I4)
        24    FORMAT(I1)
              SD = SQRT(VAR)
              EX1=AMEAN+((SD**2)/2)
              EX=EXP(EX1)
              COUNT=0
              DO 666 II=1,LOOP
              DO 888 I=1,K
              NN=I
              AP(I)=FLOAT(NN)/FLOAT(K)
              AO(I)=FLOAT(NN-1)/FLOAT(K)
        888   CONTINUE
```

```
              NI=1
      1000    DO 999 J=1,N
              Y(J) = ALNORM(AMEAN,SD,IX)
      999     CONTINUE
              YY(NI) = T(Y,EX,N)
              IF (NCHECK.EQ.0) FF(NI)=DFT_ODD(YY,NI,N)
              IF (NCHECK.EQ.1) FF(NI)=DFT_EVEN(YY,NI,N)
              IF ((FF(NI).LT.0.0).OR.(FF(NI).GT.1.0)) GO TO 1000
              NI=NI+1
              IF (NI.GT.K) GO TO 777
              GO TO 1000
      777     CALL SORT(YY,FF,K)
C
C**********KOLMOGOROV SMIRNOV TEST (D)**************
C
              DO 370 I=1,K
              PP(I)=AP(I)-FF(I)
              GG(I)=FF(I)-AG(I)
              WRITE(6,17) I,YY(I),AP(I),AG(I),FF(I),PP(I),GG(I)
      17      FORMAT(3X,'I= ',I2,2X,'YY=',F6.3,2X,'AP=',F5.3,2X,'AG=',
              *F5.3,2X,'FF=',F6.3,2X,'PP=',F6.3,2X,'GG=',F6.3)
      370     CONTINUE
              I=1
              MP=PP(I)
              DO 100 I=2,K
              IF (MP.LT.PP(I)) MP=PP(I)
      100     CONTINUE
              I=1
              MG=GG(I)
              DO 101 I=2,K
              IF (MG.LT.GG(I)) MG=GG(I)
      101     CONTINUE
              IF(MP-MG) 400,400,410
      400     D = MG
              GOTO 420
```

```
410     D = MP
        DCRIT=0.24
420     IF(D.LT.DCRIT) THEN
        COUNT=COUNT+1
        WRITE(6,430)
430     FORMAT(5X,'ACCEPT HYPOTHESIS')
        ELSE
        WRITE(6,440)
440     FORMAT(5X,'REJECT HYPOTHESIS')
        END IF
666     CONTINUE
        WRITE(6,450) COUNT
450     FORMAT(//5X,'COUNT ACCEPT = ',I4)
        STOP
        END
C
        REAL FUNCTION T(Y,EX,N)
        DIMENSION Y(N)
        REAL EX
        SUMY = 0
        SSUMY = 0
        DO 15 I=1,N
        SUMY = SUMY + Y(I)
        SSUMY = SSUMY + Y(I)**2
15      CONTINUE
        YBAR = SUMY/N
        YYBAR = YBAR**2
        SD = SQRT(SSUMY/N - YYBAR)
        T = (YBAR-EX)*SQRT(N)/SD
        RETURN
        END
C
        FUNCTION ALNORM(AMEAN,SD,IX)
        REAL AMEAN,SD,A
        A = ANORM(AMEAN,SD,IX)
```

```
      ALNORM = EXP(A)
      RETURN
      END
C
      FUNCTION ANORM(AMEAN,SD,IX)
      ANORM  = AMEAN + ASNORM(IX)*SD
      RETURN
      END
C
      REAL FUNCTION ASNORM(IX)
      INTEGER*2 K1
      REAL NOR1,NOR2,U1,U2,MPI
      SAVE NOR1,NOR2,K1
      MPI = 3.14159265
      IF (K1.EQ.0) THEN
      U1 = ARAND(IX)
      U2 = ARAND(IX)
      NOR1 = SQRT(-2*LOG(U1))*COS(2*MPI*U2)
      NOR2 = SQRT(-2*LOG(U1))*SIN(2*MPI*U2)
      K1 = 1
      ASNORM = NOR1
      ELSE
      K1 = 0
      ASNORM = NOR2
      ENDIF
      RETURN
      END
C
      FUNCTION ARAND(IX)
      INTEGER IX
      IX = IX*65539
      IF(IX.LT.0) IX = 1+(IX+2147483647)
      ARAND = IX
      ARAND = ARAND*0.465661287E-9
      RETURN
```

```
      END
C
      SUBROUTINE SORT(YY,FF,K)
      DIMENSION YY(100),FF(100)
      REAL SAVE,SAVE1
      INTEGER M
      M=K-1
      DO 5 I=1,M
      L=K-1
      DO 5 J=1,L
      IF(YY(J)-YY(J+1)) 5,5,15
15    SAVE=YY(J)
      SAVE1=FF(J)
      YY(J)=YY(J+1)
      FF(J)=FF(J+1)
      YY(J+1)=SAVE
      FF(J+1)=SAVE1
5     CONTINUE
      RETURN
      END
C
      REAL FUNCTION DFT_ODD(YY,I,N)
      DIMENSION YY(100),AA(100),TAA(100)
      INTEGER NO
      TA = YY(I)/SQRT(N-1)
      TA1 = ATAN(TA)
      TA2 = (YY(I)*SQRT(N-1))/((N-1)+YY(I)**2)
      A0 = 1.0
      AA(1) = 0.66667
      TAA(1) = AA(1)/(1+(YY(I)**2)/(N-1))
      SUMA = A0+TAA(1)
      NO = INT((N-1)-3)/2)
      DO 555 J=2,3
      AA(J) = (FLOAT(2*J)/FLOAT((2*J)+1))*AA(J-1)
      TAA(J) = AA(J)/((1+(YY(I)**2)/(N-1))**J)
```

```
      SUMA = SUMA+TAA(J)
555   CONTINUE
      DFT_ODD = 0.5+TA1+(TA2*SUMA)
      RETURN
      END
C
      REAL FUNCTION DFT_EVEN(YY,I,N)
      DIMENSION YY(100),BB(100),TBB(100)
      TB1 = YY(I)/SQRT(2*((N-1)+YY(I)**2))
      B0 = 1.0
      BB(1) = 0.5
      TBB(1) = BB(1)/(1+((YY(I)**2)/(N-1)))
      SUMB = B0+TBB(1)
      NO = INT((N-1)-2)/2)
      DO 666 J=2,NO
      BB(J) = (FLOAT((2*J)-1)/FLOAT(2*J))*BB(J-1)
      TBB(J) = BB(J)/((1+((YY(I)**2)/(N-1)))**J)
      SUMB = SUMB+TBB(J)
666   CONTINUE
      DFT_EVEN = 0.5+(TB1*SUMB)
      RETURN
      END
```

6. การประมาณการแจกแจงของตัวสถิติทดสอบที่ที่ใช้สำหรับการทดสอบสมมติฐานเกี่ยวกับค่าเฉลี่ย กรณีที่ตัวอย่างสุ่มมาจากประชากรที่มีการแจกแจงแลมดาของทูร์กี

6.1 โปรแกรมหาขนาดตัวอย่าง n อย่างน้อยที่สุดที่ควรใช้ในการประมาณ

```
C*************************************************************************
C*   THIS PROGRAM IS FIND MINIMUM SAMPLE SIZE FOR  APPROXIMATE          *
C*                    DISTRIBUTION OF T-STATISTIC                       *
C*          WHEN POPULATION IS   LAMDA 'S TURKEY DISTRIBUTION           *
C*                ALFA - TYPE I ERROR = 0.01, 0.05 AND 0.10             *
C*                N      - SAMPLE SIZE                                  *
C*************************************************************************
C
                DIMENSION Y(200),T01(200),T05(200),T10(200)
                INTEGER COUNT
                REAL A1,A2,A3,A4,LL,LP05,LU05,EX
C
                READ(5,10) IX
                READ(5,11) IN
                READ(5,12) N
                READ(5,13) ALFA
                READ(5,14) A1
                READ(5,15) A2
                READ(5,16) A3
                READ(5,17) A4
C
          10    FORMAT(I6)
          11    FORMAT(I5)
          12    FORMAT(I4)
          13    FORMAT(F5.3)
          14    FORMAT(F8.3)
          15    FORMAT(F8.3)
          16    FORMAT(F8.3)
          17    FORMAT(F8.3)
```

```
C
      EX=100.0
      VA=100.0
      A1=A1*DSQRT(VA)+EX
      A2=A2/DSQRT(VA)
1000  COUNT = 0
      DO 999 I=1,IN
      DO 888 J=1,N
      RN=ARAND(IX)
      Y(J) = A1+(RN**A3-(1-RN)**A4)/A2
888   CONTINUE
      TTEST = T(Y,EX,N)
      TCAL = ABS(TTEST)
      IF (ALFA.EQ.0.01) THEN
      IF (TCAL.GE.T01(N-1)) COUNT = COUNT+1
      ELSE  IF (ALFA.EQ.0.05) THEN
      IF (TCAL.GE.T05(N-1)) COUNT = COUNT+1
      ELSE
      IF (TCAL.GE.T10(N-1)) COUNT = COUNT+1
      END IF
999   CONTINUE
      SCOUNT = (COUNT*1.0)/IN
      LL = (ALFA*(1.0-ALFA))/IN
      LP05 = ALPHA+(1.645*SQRT(LL))
      LU05 = 0.0
      NDOIT = 0
      IF((SCOUNT.GT.LU05).AND.(SCOUNT.LT.LP05)) THEN
      WRITE(6,32) N,ALFA
 32   FORMAT(/3X,'SAMPLE SIZE : N = ',I4,5X,'SCOUNT INSIDE
      *AT ALFA = ',F5.3)
      ELSE
      WRITE(6,33) N,ALFA
 33   FORMAT(/3X,'SAMPLE SIZE : N = ',I4,5X,'SCOUNT OUTSIDE
      *AT ALFA = ',F5.3)
      NDOIT = 1
```

```
      END IF
      IF (NDOIT.EQ.1) THEN
      N=N+1
      GO TO 1000
      ELSE
      GO TO 9999
      END IF
9999  STOP
      END
C
      FUNCTION T(Y,EX,N)
      DIMENSION Y(N)
      REAL EX
      SUMY = 0
      SSUMY = 0
      DO 15 I=1,N
      SUMY = SUMY + Y(I)
      SSUMY = SSUMY + Y(I)**2
15    CONTINUE
      YBAR = SUMY/N
      YBAR = YBAR**2
      SD = SQRT(SSUMY/N - YYBAR)
      T = (YBAR-EX)*SQRT(N)/SD
      RETURN
      END
C
      FUNCTION ARAND(IX)
      INTEGER IX
      IX = IX*65539
      IF(IX.LT.0) IX = 1+(IX+2147483647)
      ARAND = IX
      ARAND = ARAND*0.465661287E-9
      RETURN
      END
```

6.2 โปรแกรมทดสอบเทียบความกลมกลืนกัน

```
C*************************************************************************
C*        TEST GOODNESS OF FIT BY KOLMOGOROV-SMIRNOV TEST                *
C*              APPROXIMATE   DISTRIBUTION OF T-STATISTIC                *
C*        WHEN POPULATION IS  LAMDA'S TURKEY DISTRIBUTION                *
C*************************************************************************
C
                DIMENSION YY(100),AP(100),AG(100),PP(100)
                DIMENSION GG(100),Y(200),FF(100)
                INTEGER K,NN,NI,COUNT
                REAL A1,A2,A3,A4,EX
C
                K=20
                LOOP=200
                READ(5,13) IX
                READ(5,14) A1
                READ(5,15) A2
                READ(5,16) A3
                READ(5,17) A4
                READ(5,23) N
                READ(5,24) NCHECK
          13    FORMAT(I8)
          14    FORMAT(F8.3)
          15    FORMAT(F8.3)
          16    FORMAT(F8.3)
          17    FORMAT(F8.3)
          23    FORMAT(I4)
          24    FORMAT(I1)
                SD = SQRT(VAR)
                EX1=AMEAN+((SD**2)/2)
                EX=EXP(EX1)
                COUNT=0
                DO 666 II=1,LOOP
                DO 888 I=1,K
```

```
            NN=I
            AP(I)=FLOAT(NN)/FLOAT(K)
            AG(I)=FLOAT(NN-1)/FLOAT(K)
  888       CONTINUE
            NI=1
  1000      DO 999 J=1,N
            RN=ARAND(IX)
            Y(J) = A1+(RN**A3-(1-RN)**A4)/A2
  999       CONTINUE
            YY(NI) = T(Y,EX,N)
            IF (NCHECK.EQ.0) FF(NI)=DFT_ODD(YY,NI,N)
            IF (NCHECK.EQ.1) FF(NI)=DFT_EVEN(YY,NI,N)
            IF ((FF(NI).LT.0.0).OR.(FF(NI).GT.1.0)) GO TO 1000
            NI=NI+1
            IF (NI.GT.K) GO TO 777
            GO TO 1000
  777       CALL SORT(YY,FF,K)
C
C**********KOLMOGOROV SMIRNOV TEST (D)**************
C
            DO 370 I=1,K
            PP(I)=AP(I)-FF(I)
            GG(I)=FF(I)-AG(I)
            WRITE(6,17) I,YY(I),AP(I),AG(I),FF(I),PP(I),GG(I)
  17        FORMAT(3X,'I= ',I2,2X,'YY=',F6.3,2X,'AP=',F5.3,2X,'AG=',
           *F5.3,2X,'FF=',F6.3,2X,'PP=',F6.3,2X,'GG=',F6.3)
  370       CONTINUE
            I=1
            MP=PP(I)
            DO 100 I=2,K
            IF (MP.LT.PP(I)) MP=PP(I)
  100       CONTINUE
            I=1
            MG=GG(I)
            DO 101 I=2,K
```

```
      IF (MG.LT.GG(I)) MG=GG(I)
101   CONTINUE
      IF(MP-MG) 400,400,410
400   D = MG
      GOTO 420
410   D = MP
      DCRIT=0.24
420   IF(D.LT.DCRIT) THEN
      COUNT=COUNT+1
      WRITE(6,430)
430   FORMAT(5X,'ACCEPT HYPOTHESIS')
      ELSE
      WRITE(6,440)
440   FORMAT(5X,'REJECT HYPOTHESIS')
      END IF
666   CONTINUE
      WRITE(6,450) COUNT
450   FORMAT(/5X,'COUNT ACCEPT = ',I4)
      STOP
      END
C
      REAL FUNCTION T(Y,EX,N)
      DIMENSION Y(N)
      REAL EX
      SUMY = 0
      SSUMY = 0
      DO 15 I=1,N
      SUMY = SUMY + Y(I)
      SSUMY = SSUMY + Y(I)**2
15    CONTINUE
      YBAR = SUMY/N
      YYBAR = YBAR**2
      SD = SQRT(SSUMY/N - YYBAR)
      T = (YBAR-EX)*SQRT(N)/SD
```

```
      RETURN
      END
C
      FUNCTION ALNORM(AMEAN,SD,IX)
      REAL AMEAN,SD,A
      A = ANORM(AMEAN,SD,IX)
      ALNORM = EXP(A)
      RETURN
      END
      FUNCTION ANORM(AMEAN,SD,IX)
      ANORM  = AMEAN + ASNORM(IX)*SD
      RETURN
      END
C
      REAL FUNCTION ASNORM(IX)
      INTEGER*2 K1
      REAL NOR1,NOR2,U1,U2,MPI
      SAVE NOR1,NOR2,K1
      MPI = 3.14159265
      IF (K1.EQ.0) THEN
      U1 = ARAND(IX)
      U2 = ARAND(IX)
      NOR1 = SQRT(-2*LOG(U1))*COS(2*MPI*U2)
      NOR2 = SQRT(-2*LOG(U1))*SIN(2*MPI*U2)
      K1 = 1
      ASNORM = NOR1
      ELSE
      K1 = 0
      ASNORM = NOR2
      ENDIF
      RETURN
      END
C
```

```
      FUNCTION ARAND(IX)
      INTEGER IX
      IX = IX*65539
      IF(IX.LT.0) IX = 1+(IX+2147483647)
      ARAND = IX
      ARAND = ARAND*0.465661287E-9
      RETURN
      END
C
      SUBROUTINE SORT(YY,FF,K)
      DIMENSION YY(100),FF(100)
      REAL SAVE,SAVE1
      INTEGER M
      M=K-1
      DO 5 I=1,M
      L=K-1
      DO 5 J=1,L
      IF(YY(J)-YY(J+1)) 5,5,15
15    SAVE=YY(J)
      SAVE1=FF(J)
      YY(J)=YY(J+1)
      FF(J)=FF(J+1)
      YY(J+1)=SAVE
      FF(J+1)=SAVE1
5     CONTINUE
      RETURN
      END
C
      REAL FUNCTION DFT_ODD(YY,I,N)
      DIMENSION YY(100),AA(100),TAA(100)
      INTEGER NO
      TA = YY(I)/SQRT(N-1)
      TA1 = ATAN(TA)
      TA2 = (YY(I)*SQRT(N-1))/((N-1)+YY(I)**2)
      A0 = 1.0
```

```
      AA(1) = 0.66667
      TAA(1) = AA(1)/(1+(YY(I)**2)/(N-1))
      SUMA = A0+TAA(1)
      NO = INT((N-1)-3)/2)
      DO 555 J=2,3
      AA(J) = (FLOAT(2*J)/FLOAT((2*J)+1))*AA(J-1)
      TAA(J) = AA(J)/((1+(YY(I)**2)/(N-1))**J)
      SUMA = SUMA+TAA(J)
555   CONTINUE

      DFT_ODD = 0.5+TA1+(TA2*SUMA)
      RETURN
      END
C
      REAL FUNCTION DFT_EVEN(YY,I,N)
      DIMENSION YY(100),BB(100),TBB(100)
      TB1 = YY(I)/SQRT(2*((N-1)+YY(I)**2))
      B0 = 1.0
      BB(1) = 0.5
      TBB(1) = BB(1)/(1+((YY(I)**2)/(N-1)))
      SUMB = B0+TBB(1)
      NO = INT((N-1)-2)/2)
      DO 666 J=2,NO
      BB(J) = (FLOAT((2*J)-1)/FLOAT(2*J))*BB(J-1)
      TBB(J) = BB(J)/((1+((YY(I)**2)/(N-1)))**J)
      SUMB = SUMB+TBB(J)
666   CONTINUE
      DFT_EVEN = 0.5+(TB1*SUMB)
      RETURN
      END
```

ภาคผนวก ค.

ตารางที่ ง. ตาราง RAMBERG กำหนดพารามิเตอร์แลมดาของการแจกแจงแลมดาของเดอร์กี จำแนกตามค่าความเบ้ α_3 และค่าความโด่ง α_4 เมื่อ $\mu = 0.0$ และ $\sigma^2 = 1.0$

$\alpha_3 = 0.0$

α_4	LAM 1	LAM 2	LAM 3	LAM 4
1.8	.0	.5776	1.0000	1.0000
2.0	.0	.4952	.5883	.5883
2.2	.0	.4197	.4092	.4092
2.4	.0	.3633	.3032	.3032
2.6	.0	.2949	.2303	.2303
2.8	.0	.2433	.1765	.1765
3.0	.0	.1976	.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	.0262	.0148	.0148
4.1	.0	.0128	.7160-	.7160-
4.2	.0	-.0659-	-.0363-	-.0363-
4.3	.0	-.0123	-.6706-	-.6706-
4.4	.0	-.0281	-.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	-.2516	-.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	.3316	.1128	.5802
2.4	-.375	.3228	.1876	.3981
2.6	-.143	.2924	.1973	.2805
2.8	-.083	.2429	.1625	.1983
3.0	-.059	.1975	.1276	.1425
3.2	-.046	.1565	.0974	.1061
3.4	-.038	.1194	.0716	.0770
3.6	-.033	.0856	.0499	.0530
3.8	-.027	.0548	.0311	.0327
4.0	-.024	.0264	.0146	.0153
4.1	-.024	.0132	.7184-	.7504-
4.2	-.024	.0004-	.0380-	.0397-
4.3	-.022	-.0120	-.6386-	-.6683-
4.4	-.022	-.0238	-.0126	-.0131
4.6	-.018	-.0462	-.0240	-.0248
4.8	-.019	-.0671	-.0342	-.0356
5.0	-.016	-.0867	-.0435	-.0448
5.2	-.016	-.1050	-.0519	-.0538
5.4	-.015	-.1222	-.0596	-.0612
5.6	-.014	-.1386	-.0667	-.0684
5.8	-.014	-.1538	-.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	-.979-	-.2613	-.1147	-.1167
7.8	-.999-	-.2707	-.1180	-.1201
8.0	-.928-	-.2797	-.1212	-.1232
8.2	-.906-	-.2884	-.1242	-.1262
8.4	-.931-	-.2968	-.1270	-.1291
8.6	-.912-	-.3048	-.1297	-.1318
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-	.9071-
2.0	-1.271	.3028	.0412	.7373
2.2	-.872	.3177	.0941	.5700
2.4	-.515	.3168	.1477	.4116
2.6	-.269	.2863	.1678	.2831
2.8	-.166	.2417	.1486	.2033
3.0	-.117	.1977	.1205	.1503
3.2	-.092	.1572	.0936	.1111
3.4	-.076	.1203	.0698	.0803
3.6	-.065	.0866	.0490	.0552
3.8	-.057	.0556	.0308	.0342
4.0	-.049	.0276	.0189	.0163
4.1	-.048	.0142	.7806-	.8302-
4.2	-.046	.1480-	.0762-	.0828-
4.3	-.044	-.0108	-.5703-	-.6174-
4.4	-.041	-.0227	-.0110	-.0127
4.6	-.037	-.0452	-.0231	-.0247
4.8	-.036	-.0661	-.0332	-.0356
5.0	-.033	-.0857	-.0424	-.0450
5.2	-.032	-.1040	-.0507	-.0537
5.4	-.030	-.1213	-.0584	-.0616
5.6	-.028	-.1375	-.0656	-.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	-.2878	-.1229	-.1270
8.4	-.018	-.2961	-.1258	-.1298
8.6	-.017	-.3041	-.1285	-.1325
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	.0316	.7204
2.2	-.944	.3056	.0782	.5623
2.4	-.617	.3031	.1215	.4194
2.6	-.376	.2791	.1435	.2894
2.8	-.244	.2397	.1350	.2156
3.0	-.177	.1980	.1135	.1586
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	.6378-	.9564-
4.2	-.069	.3217-	.1667-	.1880-
4.3	-.066	-.9113-	-.4680-	-.5278-
4.4	-.063	-.0210	-.0107	-.0120
4.6	-.058	-.0435	-.0216	-.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	.0638	.5571
2.4	-.706	.2919	.1013	.4244
2.6	-.471	.2718	.1233	.3120
2.8	-.322	.2374	.1221	.2273
3.0	-.237	.1983	.1065	.1672
3.2	-.187	.1599	.0866	.1230
3.4	-.154	.1240	.0667	.0889
3.6	-.132	.0908	.0482	.0615
3.8	-.116	.0601	.0314	.0389
4.0	-.103	.0318	.0164	.0196
4.1	-.097	.0185	.9667-	.0113
4.2	-.093	.5707-	.2694-	.3629-
4.3	-.089	-.6641-	-.3382-	-.3929-
4.4	-.085	-.9261-	-.0106	
4.6	-.079	-.0410	-.0202	-.0233
4.8	-.074	-.0622	-.0302	-.0345
5.0	-.069	-.0818	-.0392	-.0444
5.2	-.065	-.1003	-.0475	-.0534
5.4	-.061	-.1176	-.0551	-.0615
5.6	-.058	-.1339	-.0621	-.0689
5.8	-.055	-.1494	-.0686	-.0757
6.0	-.053	-.1639	-.0745	-.0819
6.2	-.051	-.1778	-.0801	-.0877
6.4	-.049	-.1909	-.0853	-.0930
6.6	-.047	-.2034	-.0901	-.0980
6.8	-.045	-.2153	-.0947	-.1026
7.0	-.044	-.2265	-.0989	-.1069
7.2	-.043	-.2374	-.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	-.1228	-.1309
8.6	-.035	-.3016	-.1255	-.1336
8.8	-.035	-.3092	-.1281	-.1362
9.0	-.034	-.3168	-.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	.2748	.0105	.7034
2.2	-1.084	.2867	.0506	.5548
2.4	-.790	.2820	.0843	.4294
2.6	-.558	.2650	.1062	.3226
2.8	-.398	.2349	.1099	.2385
3.0	-.298	.1987	.0996	.1763
3.2	-.237	.1619	.0831	.1300
3.4	-.196	.1266	.0653	.0942
3.6	-.167	.0937	.0481	.0656
3.8	-.147	.0632	.0321	.0421
4.0	-.131	.0351	.0176	.0224
4.1	-.126	.0217	.0108	.0136
4.2	-.118	.8889-	.4408-	.5667-
4.3	-.113	-.3676-	-.1713-	-.2103-
4.4	-.108	-.0158	-.7540-	-.9179-
4.6	-.099	-.0380	-.0184	-.0220
4.8	-.094	-.0591	-.0282	-.0334
5.0	-.087	-.0790	-.0373	-.0436
5.2	-.082	-.0974	-.0455	-.0527
5.4	-.077	-.1149	-.0531	-.0610
5.6	-.073	-.1312	-.0601	-.0685
5.8	-.070	-.1467	-.0665	-.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	-.058	-.2129	-.0927	-.1027
7.0	-.055	-.2242	-.0970	-.1070
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	-.044	-.2995	-.1238	-.1339
8.8	-.044	-.3072	-.1264	-.1365
9.0	-.043	-.3147	-.1289	-.1390
9.2	-.042	-.3220	-.1313	-.1414

ตารางที่ ง. (ต่อ)

$\alpha_3 = 0.30$

α_4	LAM 1	LAM 2	LAM 3	LAM 4
2.0	-1.550	.2660	.0000	.7020
2.2	-1.164	.2755	.0380	.5556
2.4	-.871	.2733	.0695	.4348
2.6	-.642	.2586	.0911	.3324
2.8	-.474	.2325	.0983	.2495
3.0	-.362	.1991	.0925	.1859
3.2	-.288	.1641	.0786	.1377
3.4	-.239	.1298	.0640	.1003
3.6	-.204	.0973	.0481	.0704
3.8	-.179	.0671	.0330	.0460
4.0	-.160	.0389	.0190	.0255
4.2	-.144	.0127	.6175-	.0035+
4.3	-.138	.0789+	.0380+	.0489+
4.4	-.131	-.0116	-.5554+	-.7057+
4.5	-.129	-.0231	-.0110	-.0139
4.6	-.121	-.0343	-.0163	-.0203
4.8	-.113	-.0554	-.0260	-.0319
5.0	-.105	-.0752	-.0350	-.0423
5.2	-.100	-.0939	-.0432	-.0517
5.4	-.094	-.1114	-.0508	-.0601
5.6	-.089	-.1279	-.0578	-.0678
5.8	-.085	-.1435	-.0643	-.0748
6.0	-.081	-.1582	-.0703	-.0812
6.2	-.078	-.1722	-.0759	-.0872
6.4	-.075	-.1854	-.0811	-.0927
6.6	-.072	-.1979	-.0860	-.0977
6.8	-.069	-.2100	-.0906	-.1025
7.0	-.067	-.2214	-.0948	-.1069
7.2	-.065	-.2325	-.0990	-.1111
7.4	-.063	-.2427	-.1028	-.1149
7.6	-.061	-.2528	-.1064	-.1186
7.8	-.060	-.2623	-.1098	-.1220
8.0	-.058	-.2716	-.1131	-.1253
8.2	-.056	-.2805	-.1162	-.1284
8.4	-.055	-.2889	-.1191	-.1313
8.6	-.054	-.2971	-.1219	-.1341
8.8	-.053	-.3050	-.1246	-.1367
9.0	-.052	-.3125	-.1271	-.1392
9.2	-.051	-.3197	-.1295	-.1416

$\alpha_3 = 0.35$

α_4	LAM 1	LAM 2	LAM 3	LAM 4
2.0	-1.539	.2639	.0000+	.6836+
2.2	-1.252	.2668	.0256	.5599
2.4	-.955	.2653	.0559	.4415
2.6	-.728	.2529	.0775	.3423
2.8	-.550	.2298	.0873	.2606
3.0	-.427	.1996	.0854	.1961
3.2	-.343	.1665	.0750	.1462
3.4	-.285	.1333	.0625	.1072
3.6	-.243	.1014	.0492	.0760
3.8	-.213	.0718	.0340	.0505
4.0	-.191	.0436	.0206	.0293
4.2	-.172	.0173	.0158+	.0112
4.3	-.163	.4870+	.2293+	.3090+
4.4	-.156	-.7105+	-.3332+	-.4631+
4.5	-.151	-.0182	-.8723+	-.0115
4.6	-.142	-.0298	-.0139	-.0180
4.8	-.132	-.0511	-.0236	-.0300
5.0	-.124	-.0710	-.0325	-.0407
5.2	-.117	-.0898	-.0407	-.0503
5.4	-.110	-.1074	-.0483	-.0589
5.6	-.105	-.1240	-.0553	-.0668
5.8	-.100	-.1396	-.0618	-.0739
6.0	-.096	-.1545	-.0678	-.0805
6.2	-.091	-.1685	-.0735	-.0865
6.4	-.088	-.1818	-.0787	-.0921
6.6	-.085	-.1945	-.0836	-.0973
6.8	-.082	-.2067	-.0883	-.1021
7.0	-.079	-.2181	-.0926	-.1066
7.2	-.077	-.2291	-.0967	-.1108
7.4	-.074	-.2396	-.1006	-.1147
7.6	-.072	-.2496	-.1042	-.1184
7.8	-.070	-.2593	-.1077	-.1219
8.0	-.068	-.2685	-.1109	-.1252
8.2	-.066	-.2775	-.1141	-.1283
8.4	-.065	-.2860	-.1170	-.1313
8.6	-.063	-.2942	-.1198	-.1341
8.8	-.062	-.3020	-.1225	-.1367
9.0	-.060	-.3096	-.1251	-.1392
9.2	-.059	-.3172	-.1276	-.1417

$\alpha_3 = 0.40$

α_4	LAM 1	LAM 2	LAM 3	LAM 4
2.2	-1.394	.2582	.0129	.5683
2.4	-1.061	.2580	.0430	.4500
2.6	-.808	.2473	.0648	.3527
2.8	-.627	.2273	.0767	.2720
3.0	-.494	.2000	.0782	.2069
3.2	-.400	.1690	.0718	.1555
3.4	-.333	.1371	.0609	.1149
3.6	-.284	.1060	.0482	.0824
3.8	-.248	.0764	.0351	.0558
4.0	-.222	.0485	.0223	.0337
4.2	-.200	.0224	.0103	.0148
4.3	-.190	.0100	.4587+	.4521+
4.4	-.182	-.0397+	-.0182+	-.0250+
4.5	-.174	-.0134	-.6208+	-.8533+
4.6	-.166	-.0288	-.0113	-.0153
4.8	-.155	-.0462	-.0209	-.0277
5.0	-.146	-.0662	-.0297	-.0387
5.2	-.136	-.0850	-.0379	-.0485
5.4	-.129	-.1027	-.0455	-.0574
5.6	-.122	-.1194	-.0525	-.0656
5.8	-.115	-.1352	-.0591	-.0727
6.0	-.111	-.1501	-.0651	-.0794
6.2	-.106	-.1643	-.0706	-.0856
6.4	-.102	-.1778	-.0761	-.0913
6.6	-.098	-.1906	-.0811	-.0966
6.8	-.094	-.2026	-.0857	-.1016
7.0	-.091	-.2142	-.0901	-.1060
7.2	-.089	-.2253	-.0942	-.1103
7.4	-.086	-.2359	-.0981	-.1143
7.6	-.083	-.2459	-.1018	-.1180
7.8	-.081	-.2556	-.1053	-.1216
8.0	-.079	-.2650	-.1086	-.1249
8.2	-.077	-.2741	-.1118	-.1281
8.4	-.075	-.2827	-.1148	-.1311
8.6	-.073	-.2908	-.1176	-.1339
8.8	-.072	-.2986	-.1203	-.1366
9.0	-.070	-.3064	-.1229	-.1391
9.2	-.069	-.3139	-.1254	-.1416
9.4	-.067	-.3210	-.1278	-.1439

$\alpha_3 = 0.45$

α_4	LAM 1	LAM 2	LAM 3	LAM 4
2.2	-1.471	.2500	.0000	.5812
2.4	-1.138	.2511	.0305	.4608
2.6	-.894	.2424	.0528	.3641
2.8	-.707	.2288	.0663	.2890
3.0	-.565	.2003	.0707	.2304
3.2	-.460	.1716	.0674	.1657
3.4	-.384	.1412	.0590	.1236
3.6	-.329	.1110	.0480	.0897
3.8	-.287	.0818	.0361	.0619
4.0	-.255	.0542	.0241	.0388
4.2	-.230	.0282	.0126	.0193
4.3	-.221	.0158	.7045+	.0106
4.4	-.208	.4102+	.1833+	.2691+
4.5	-.200	-.7861+	-.3505+	-.5065+
4.6	-.192	-.0191	-.8511+	-.0121
4.8	-.178	-.0406	-.0180	-.0249
5.0	-.165	-.0607	-.0268	-.0362
5.2	-.157	-.0796	-.0349	-.0464
5.4	-.147	-.0975	-.0425	-.0555
5.6	-.140	-.1142	-.0495	-.0637
5.8	-.132	-.1302	-.0561	-.0712
6.0	-.127	-.1453	-.0622	-.0781
6.2	-.121	-.1599	-.0679	-.0844
6.4	-.116	-.1731	-.0733	-.0902
6.6	-.112	-.1860	-.0783	-.0956
6.8	-.108	-.1983	-.0830	-.1006
7.0	-.104	-.2098	-.0874	-.1052
7.2	-.101	-.2211	-.0916	-.1096
7.4	-.097	-.2316	-.0955	-.1136
7.6	-.095	-.2419	-.0992	-.1175
7.8	-.092	-.2518	-.1026	-.1211
8.0	-.090	-.2611	-.1061	-.1245
8.2	-.088	-.2702	-.1093	-.1277
8.4	-.085	-.2789	-.1124	-.1307
8.6	-.084	-.2871	-.1152	-.1336
8.8	-.081	-.2952	-.1180	-.1363
9.0	-.080	-.3029	-.1206	-.1389
9.2	-.078	-.3102	-.1231	-.1413
9.4	-.076	-.3176	-.1256	-.1437

$\alpha_3 = 0.50$

α_4	LAM 1	LAM 2	LAM 3	LAM 4
2.4	-1.245	.2445	.0178	.4748
2.6	-.987	.2376	.0410	.3770
2.8	-.790	.2225	.0561	.2969
3.0	-.635	.2006	.0630	.2307
3.2	-.525	.1742	.0625	.1768
3.4	-.440	.1458	.0566	.1332
3.6	-.376	.1163	.0476	.0979
3.8	-.329	.0877	.0369	.0689
4.0	-.290	.0604	.0259	.0447
4.2	-.262	.0345	.0149	.0243
4.3	-.248	.0221	.9582+	.0152
4.4	-.238	.0101	.4383+	.6815+
4.5	-.228	-.1612+	-.0700+	-.1066+
4.6	-.219	-.0128	-.5570+	-.8334+
4.8	-.202	-.0344	-.0149	-.0216
5.0	-.188	-.0546	-.0236	-.0333
5.2	-.177	-.0737	-.0317	-.0438
5.4	-.167	-.0917	-.0393	-.0532
5.6	-.157	-.1087	-.0464	-.0617
5.8	-.150	-.1246	-.0529	-.0694
6.0	-.142	-.1398	-.0591	-.0764
6.2	-.137	-.1542	-.0648	-.0829
6.4	-.131	-.1679	-.0702	-.0889
6.6	-.126	-.1809	-.0753	-.0944
6.8	-.122	-.1933	-.0800	-.0995
7.0	-.117	-.2050	-.0845	-.1042
7.2	-.114	-.2163	-.0887	-.1087
7.4	-.110	-.2270	-.0927	-.1128
7.6	-.107	-.2374	-.0965	-.1167
7.8	-.104	-.2473	-.1001	-.1204
8.0	-.101	-.2567	-.1035	-.1238
8.2	-.098	-.2659	-.1067	-.1271
8.4	-.095	-.2745	-.1098	-.1301
8.6	-.094	-.2830	-.1127	-.1331
8.8	-.091	-.2910	-.1155	-.1358
9.0	-.089	-.2986	-.1181	-.1384
9.2	-.086	-.3064	-.1207	-.1410
9.4	-.086	-.3134	-.1231	-.1433
9.6	-.084	-.3206	-.1255	-.1456

$\alpha_3 = 0.55$

α_4	LAM 1	LAM 2	LAM 3	LAM 4
2.4	-1.370	.2379	.8443+	.4931
2.6	-1.087	.2331	.0292	.3920
2.8	-.878	.2202	.0459	.3109
3.0	-.716	.2009	.0551	.2440
3.2	-.593	.1767	.0572	.1889
3.4	-.499	.1497	.0538	.1438
3.6	-.428	.1217	.0447	.1070
3.8	-.372	.0940	.0376	.0767
4.0	-.330	.0670	.0275	.0514
4.2	-.298	.0413	.0172	.0301
4.4	-.269	.0170	.7149+	.0118
4.5	-.257	.5355+	.2258+	.3644+
4.6	-.247	-.5958+	-.2515+	-.3975+
4.7	-.237	-.0169	-.7160+	-.0111
4.8	-.227	-.0276	-.0117	-.0178
5.0	-.213	-.0480	-.0203	-.0300
5.2	-.200	-.0671	-.0283	-.0408
5.4	-.187	-.0852	-.0358	-.0505
5.6	-.177	-.1024	-.0430	-.0593
5.8	-.169	-.1184	-.0495	-.0672
6.0	-.161	-.1338	-.0557	-.0745
6.2	-.153	-.1483	-.0615	-.0811
6.4	-.147	-.1620	-.0669	-.0872
6.6	-.141	-.1753	-.0721	-.0929
6.8	-.136	-.1878	-.0769	-.0981
7.0	-.131	-.1997	-.0814	-.1030
7.2	-.127	-.2111	-.0857	-.1075
7.4	-.123	-.2218	-.0897	-.1117
7.6	-.119	-.2322	-.0935	-.1157
7.8	-.115	-.2422	-.0972	-.1194
8.0	-.113	-.2519	-.1006	-.1230
8.2	-.110	-.2610	-.1039	-.1263
8.4	-.107	-.2698	-.1070	-.1296
8.6	-.104	-.2784	-.1100	-.1326
8.8	-.102	-.2864	-.1128	-.1352
9.0	-.100	-.2943	-.1155	-.1379
9.2	-.097	-.3019	-.1181	-.1404
9.4	-.095	-.3092	-.1206	-.1428
9.6	-.094	-.3164	-.1230	-.1452

ตารางที่ ง. (ต่อ)

$\alpha_3 = 0.60$

α_4	LAN 1	LAN 2	LAN 3	LAN 4
2.4	-1.411	.2347	.0000*	.4851*
2.6	-1.198	.2286	.0171	.4098
2.8	-.972	.2180	.0355	.3265
3.0	-.800	.2009	.0467	.2583
3.2	-.665	.1791	.0516	.2020
3.4	-.562	.1539	.0506	.1554
3.6	-.482	.1273	.0456	.1171
3.8	-.420	.1005	.0379	.0854
4.0	-.372	.0760	.0289	.0589
4.2	-.335	.0486	.0196	.0366
4.4	-.302	.0284	.9911*	.0178
4.5	-.289	.0126	.5219*	.8965*
4.6	-.277	.1892*	.0611*	.1025*
4.7	-.266	-.9531*	-.3916*	-.6425*
4.8	-.254	-.0202	-.8326*	-.0134
5.0	-.230	-.0407	-.0168	-.0261
5.2	-.222	-.0600	-.0248	-.0373
5.4	-.209	-.0782	-.0323	-.0474
5.6	-.197	-.0956	.0394	-.0565
5.8	-.187	-.1116	-.0460	-.0647
6.0	-.179	-.1273	-.0522	-.0722
6.2	-.171	-.1419	-.0580	-.0790
6.4	-.163	-.1559	-.0635	-.0853
6.6	-.157	-.1691	-.0686	-.0911
6.8	-.151	-.1818	-.0735	-.0965
7.0	-.146	-.1938	-.0781	-.1015
7.2	-.141	-.2052	-.0824	-.1061
7.4	-.137	-.2163	-.0865	-.1105
7.6	-.132	-.2267	-.0904	-.1145
7.8	-.128	-.2368	-.0941	-.1183
8.0	-.124	-.2465	-.0976	-.1219
8.2	-.121	-.2557	-.1009	-.1253
8.4	-.118	-.2647	-.1041	-.1285
8.6	-.115	-.2732	-.1071	-.1315
8.8	-.113	-.2815	-.1100	-.1344
9.0	-.110	-.2894	-.1127	-.1371
9.2	-.108	-.2970	-.1153	-.1397
9.4	-.105	-.3045	-.1179	-.1422
9.6	-.103	-.3116	-.1203	-.1445

$\alpha_3 = 0.65$

α_4	LAN 1	LAN 2	LAN 3	LAN 4
2.6	-1.329	.2290	.3908*	.6319
2.8	-1.076	.2157	.0246	.3643
3.0	-.869	.2016	.0380	.2782
3.2	-.704	.1812	.0449	.2162
3.4	-.630	.1582	.0464	.1692
3.6	-.542	.1330	.0435	.1283
3.8	-.472	.1072	.0377	.0952
4.0	-.418	.0813	.0300	.0678
4.2	-.374	.0568	.0215	.0460
4.4	-.338	.0323	.0126	.0239
4.5	-.320	.0207	.8137*	.0150
4.6	-.310	.9399*	.3719*	.6660*
4.7	-.297	-.1593*	-.0634*	-.1106*
4.8	-.289	-.0123	-.4921*	-.8391*
5.0	-.268	-.0326	-.0132	-.0216
5.2	-.248	-.0524	-.0211	-.0334
5.4	-.231	-.0707	-.0286	-.0438
5.6	-.219	-.0880	-.0356	-.0532
5.8	-.201	-.1046	-.0422	-.0618
6.0	-.198	-.1201	-.0484	-.0695
6.2	-.189	-.1350	-.0543	-.0766
6.4	-.181	-.1491	-.0598	-.0831
6.6	-.174	-.1625	-.0650	-.0891
6.8	-.167	-.1753	-.0700	-.0944
7.0	-.161	-.1874	-.0746	-.0997
7.2	-.155	-.1991	-.0790	-.1045
7.4	-.150	-.2100	-.0831	-.1089
7.6	-.145	-.2208	-.0871	-.1131
7.8	-.141	-.2309	-.0908	-.1170
8.0	-.137	-.2407	-.0944	-.1207
8.2	-.134	-.2501	-.0977	-.1242
8.4	-.130	-.2591	-.1010	-.1276
8.6	-.127	-.2677	-.1040	-.1305
8.8	-.124	-.2761	-.1069	-.1335
9.0	-.121	-.2840	-.1097	-.1362
9.2	-.119	-.2919	-.1124	-.1389
9.4	-.116	-.2994	-.1150	-.1414
9.6	-.114	-.3065	-.1174	-.1438
9.8	-.112	-.3136	-.1198	-.1461

$\alpha_3 = 0.70$

α_4	LAN 1	LAN 2	LAN 3	LAN 4
2.6	-1.368	.2217	.0000*	.4353*
2.8	-1.194	.2132	.0130	.3651
3.0	-.987	.2000	.0286	.2918
3.2	-.828	.1833	.0378	.2319
3.4	-.706	.1621	.0416	.1821
3.6	-.606	.1385	.0409	.1406
3.8	-.529	.1139	.0369	.1060
4.0	-.467	.0889	.0307	.0768
4.2	-.419	.0643	.0232	.0522
4.4	-.379	.0404	.0151	.0312
4.6	-.344	.0178	.6767*	.0130
4.7	-.331	.6799*	.2607*	.4872*
4.8	-.317	-.3917*	-.1512*	-.2750*
4.9	-.305	-.0184	-.5574*	-.9893*
5.0	-.294	-.0285	-.9565*	-.0166
5.2	-.276	-.0441	-.0173	-.0269
5.4	-.257	-.0626	-.0247	-.0390
5.6	-.243	-.0802	-.0317	-.0496
5.8	-.229	-.0967	-.0383	-.0584
6.0	-.219	-.1125	-.0445	-.0665
6.2	-.209	-.1275	-.0504	-.0738
6.4	-.199	-.1417	-.0560	-.0805
6.6	-.191	-.1550	-.0613	-.0867
6.8	-.184	-.1682	-.0662	-.0924
7.0	-.177	-.1805	-.0709	-.0977
7.2	-.170	-.1923	-.0754	-.1026
7.4	-.165	-.2036	-.0796	-.1072
7.6	-.160	-.2144	-.0836	-.1115
7.8	-.155	-.2246	-.0874	-.1155
8.0	-.151	-.2346	-.0910	-.1193
8.2	-.147	-.2439	-.0944	-.1228
8.4	-.143	-.2532	-.0977	-.1262
8.6	-.139	-.2618	-.1008	-.1293
8.8	-.136	-.2703	-.1038	-.1323
9.0	-.133	-.2784	-.1066	-.1352
9.2	-.130	-.2862	-.1093	-.1379
9.4	-.127	-.2937	-.1119	-.1406
9.6	-.125	-.3011	-.1144	-.1429
9.8	-.122	-.3081	-.1168	-.1452

$\alpha_3 = 0.75$

α_4	LAN 1	LAN 2	LAN 3	LAN 4
2.8	-1.334	.2104	.0000	.3903
3.0	-1.097	.2003	.0183	.3119
3.2	-.921	.1850	.0299	.2492
3.4	-.789	.1658	.0360	.1974
3.6	-.677	.1440	.0375	.1562
3.8	-.590	.1206	.0355	.1179
4.0	-.521	.0966	.0309	.0873
4.2	-.466	.0726	.0246	.0614
4.4	-.419	.0492	.0174	.0392
4.6	-.384	.0266	.9663*	.0202
4.7	-.367	.0156	.5749*	.0116
4.8	-.352	.4940*	.1833*	.3583*
4.9	-.339	-.5509*	-.2061*	-.3916*
5.0	-.324	-.0157	-.5915*	-.0109
5.2	-.306	-.0353	-.0136	-.0238
5.4	-.284	-.0539	-.0207	-.0352
5.6	-.268	-.0716	-.0276	-.0454
5.8	-.254	-.0884	-.0342	-.0547
6.0	-.240	-.1044	-.0405	-.0630
6.2	-.229	-.1195	-.0464	-.0706
6.4	-.219	-.1339	-.0520	-.0776
6.6	-.209	-.1476	-.0573	-.0840
6.8	-.201	-.1607	-.0623	-.0899
7.0	-.194	-.1731	-.0670	-.0954
7.2	-.188	-.1851	-.0715	-.1005
7.4	-.181	-.1964	-.0758	-.1052
7.6	-.175	-.2074	-.0799	-.1096
7.8	-.170	-.2177	-.0837	-.1137
8.0	-.165	-.2278	-.0874	-.1176
8.2	-.160	-.2375	-.0909	-.1213
8.4	-.156	-.2466	-.0942	-.1247
8.6	-.152	-.2554	-.0974	-.1279
8.8	-.148	-.2640	-.1004	-.1310
9.0	-.145	-.2722	-.1033	-.1339
9.2	-.142	-.2802	-.1061	-.1367
9.4	-.138	-.2879	-.1088	-.1393
9.6	-.135	-.2952	-.1113	-.1418
9.8	-.133	-.3023	-.1137	-.1442
10.0	-.130	-.3093	-.1161	-.1465

$\alpha_3 = 0.80$

α_4	LAN 1	LAN 2	LAN 3	LAN 4
3.0	-1.225	.1996	.6847*	.3356
3.2	-1.025	.1864	.0211	.2687
3.4	-.874	.1692	.0295	.2143
3.6	-.758	.1492	.0333	.1691
3.8	-.657	.1272	.0333	.1310
4.0	-.582	.1042	.0303	.0989
4.2	-.519	.0810	.0254	.0716
4.4	-.468	.0580	.0192	.0482
4.6	-.425	.0357	.0123	.0281
4.8	-.392	.0142	.5035*	.0107
4.9	-.375	.3770*	.1352*	.2770*
5.0	-.361	-.6291*	-.2278*	-.4531*
5.1	-.349	-.0164	-.5981*	-.0116
5.2	-.335	-.0261	-.9598*	-.0181
5.4	-.313	-.0449	-.0167	-.0301
5.6	-.295	-.0626	-.0235	-.0408
5.8	-.279	-.0795	-.0300	-.0504
6.0	-.264	-.0958	-.0363	-.0592
6.2	-.251	-.1110	-.0422	-.0671
6.4	-.240	-.1255	-.0478	-.0743
6.6	-.230	-.1394	-.0531	-.0810
6.8	-.220	-.1527	-.0582	-.0871
7.0	-.212	-.1653	-.0630	-.0928
7.2	-.204	-.1774	-.0676	-.0980
7.4	-.197	-.1889	-.0719	-.1029
7.6	-.191	-.2000	-.0760	-.1075
7.8	-.185	-.2106	-.0799	-.1117
8.0	-.180	-.2205	-.0836	-.1157
8.2	-.174	-.2304	-.0872	-.1195
8.4	-.169	-.2397	-.0906	-.1230
8.6	-.166	-.2488	-.0938	-.1264
8.8	-.161	-.2574	-.0969	-.1295
9.0	-.157	-.2658	-.0999	-.1325
9.2	-.154	-.2737	-.1027	-.1353
9.4	-.150	-.2815	-.1054	-.1380
9.6	-.147	-.2890	-.1080	-.1406
9.8	-.144	-.2962	-.1105	-.1430
10.0	-.141	-.3033	-.1129	-.1454
10.2	-.139	-.3100	-.1152	-.1476

$\alpha_3 = 0.85$

α_4	LAN 1	LAN 2	LAN 3	LAN 4
3.0	-1.303	.1985	.0000*	.3488
3.2	-1.145	.1875	.0110	.2912
3.4	-.973	.1723	.0220	.2332
3.6	-.838	.1541	.0281	.1855
3.8	-.732	.1336	.0301	.1455
4.0	-.645	.1119	.0291	.1117
4.2	-.577	.0895	.0256	.0829
4.4	-.519	.0671	.0206	.0582
4.6	-.472	.0451	.0146	.0370
4.8	-.430	.0238	.8001*	.0185
4.9	-.413	.0134	.4561*	.0102
5.0	-.398	.3503*	.1211*	.2613*
5.1	-.383	-.6701*	-.2345*	-.4896*
5.2	-.370	-.0165	-.5808*	-.0118
5.4	-.344	-.0353	-.0127	-.0248
5.6	-.324	-.0531	-.0193	-.0356
5.8	-.305	-.0703	-.0256	-.0457
6.0	-.290	-.0864	-.0319	-.0548
6.2	-.275	-.1019	-.0378	-.0631
6.4	-.262	-.1168	-.0435	-.0707
6.6	-.251	-.1307	-.0488	-.0776
6.8	-.241	-.1442	-.0539	-.0840
7.0	-.231	-.1570	-.0588	-.0899
7.2	-.223	-.1692	-.0634	-.0953
7.4	-.215	-.1809	-.0678	-.1004
7.6	-.207	-.1921	-.0720	-.1051
7.8	-.201	-.2028	-.0759	-.1095
8.0	-.195	-.2130	-.0797	-.1136
8.2	-.190	-.2229	-.0833	-.1175
8.4	-.184	-.2324	-.0868	-.1211
8.6	-.179	-.2416	-.0901	-.1246
8.8	-.175	-.2503	-.0932	-.1278
9.0	-.171	-.2587	-.0962	-.1309
9.2	-.167	-.2669	-.0991	-.1338
9.4	-.163	-.2746	-.1019	-.1366
9.6	-.159	-.2823	-.1045	-.1392
9.8	-.156	-.2897	-.1071	-.1417
10.0	-.153	-.2967	-.1095	-.1441
10.2	-.150	-.3037	-.1119	-.1464

ตารางที่ ง. (ต่อ)

$\alpha_3 = 1.20$

α_4	LAM 1	LAM 2	LAM 3	LAM 4
4.2	-1.183	.1407	.0000*	.1997
4.4	-1.083	.1278	.5096*	.1675
4.6	-.965	.1113	.9968*	.1329
4.8	-.870	.0961	.0122	.1036
5.0	-.792	.0784	.0124	.0784
5.2	-.723	.0586	.0112	.0565
5.4	-.668	.0408	.8709*	.0372
5.6	-.615	.0233	.5611*	.0202
5.7	-.597	.0146	.3523*	.0124
5.8	-.577	.6088*	.1519*	.5050*
5.9	-.558	-.2319*	-.0594*	-.1884*
6.0	-.562	-.0962*	-.0245*	-.0784*
6.2	-.508	-.0268	-.7343*	-.0206
6.4	-.481	-.0424	-.0120	-.0315
6.6	-.454	-.0575	-.0168	-.0414
6.8	-.432	-.0719	-.0215	-.0504
7.0	-.412	-.0860	-.0262	-.0587
7.2	-.394	-.0993	-.0308	-.0662
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	-.0962
8.4	-.314	-.1695	-.0558	-.1010
8.6	-.305	-.1796	-.0594	-.1055
8.8	-.296	-.1896	-.0630	-.1098
9.0	-.287	-.1990	-.0666	-.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

$\alpha_3 = 1.30$

α_4	LAM 1	LAM 2	LAM 3	LAM 4
4.6	-1.156	.1284	.0000*	.1679
4.8	-1.084	.1129	.3174*	.1435
5.0	-.979	.0968	.7225*	.1130
5.2	-.886	.0802	.9035*	.0870
5.4	-.812	.0634	.9148*	.0645
5.6	-.749	.0466	.7959*	.0447
5.8	-.695	.0300	.5783*	.0273
6.0	-.604	.0206*	.66198*	.0239*
6.1	-.617	.0486*	.0100*	.0375**
6.2	-.614	-.0526*	-.0110*	-.0442*
6.3	-.588	-.0104	-.2450*	-.8504*
6.4	-.572	-.0182	-.4399*	-.0186
6.6	-.539	-.0333	-.8469*	-.0258
6.8	-.510	-.0480	-.0127	-.0360
7.0	-.485	-.0622	-.0170	-.0453
7.2	-.463	-.0758	-.0213	-.0538
7.4	-.442	-.0890	-.0256	-.0616
7.6	-.424	-.1017	-.0298	-.0688
7.8	-.407	-.1140	-.0340	-.0754
8.0	-.392	-.1258	-.0380	-.0816
8.2	-.378	-.1372	-.0420	-.0873
8.4	-.365	-.1480	-.0458	-.0926
8.6	-.353	-.1584	-.0495	-.0975
8.8	-.342	-.1687	-.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

$\alpha_3 = 1.40$

α_4	LAM 1	LAM 2	LAM 3	LAM 4
5.0	-1.132	.1092	.0000*	.1411
5.2	-1.106	.1011	.0787*	.1268
5.4	-1.001	.0855	.4546*	.0991
5.6	-.914	.0697	.6296*	.0758
5.8	-.844	.0538	.6530*	.0547
6.0	-.782	.0379	.5603*	.0365
6.2	-.729	.0222	.3785*	.0204
6.3	-.706	.0145	.2611*	.0130
6.4	-.683	.8822*	.1292*	.5987*
6.5	-.660	-.1224*	-.0244*	-.1052*
6.6	-.643	-.8266*	-.1702*	-.6968*
6.8	-.607	-.0230	-.5060*	-.0187
7.0	-.575	-.0371	-.8670*	-.0293
7.2	-.547	-.0510	-.0124	-.0389
7.4	-.521	-.0645	-.0163	-.0478
7.6	-.498	-.0775	-.0202	-.0559
7.8	-.475	-.0900	-.0242	-.0633*
8.0	-.458	-.1020	-.0280	-.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	-.1026
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	-.1334*
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	-.0878	-.1453
12.2	-.265	-.2794	-.0900	-.1474

$\alpha_3 = 0.90$

α_4	LAM 1	LAM 2	LAM 3	LAM 4
3.2	-1.277	.1880	.0000	.3160
3.4	-1.085	.1751	.0133	.2548
3.6	-.933	.1586	.0218	.2039
3.8	-.814	.1397	.0260	.1615
4.0	-.717	.1193	.0269	.1258
4.2	-.638	.0979	.0251	.0953
4.4	-.575	.0762	.0214	.0693
4.6	-.522	.0547	.0164	.0468
4.8	-.478	.0337	.0106	.0273
5.0	-.439	.0132	.4328*	.0102
5.1	-.422	.3239*	.1111*	.2526*
5.2	-.407	-.6308*	-.2154*	-.4735*
5.3	-.394	-.0159	-.5628*	-.0116
5.4	-.379	-.0252	-.8694*	-.0180
5.6	-.353	-.0432	-.0152	-.0298*
5.8	-.334	-.0605	-.0215	-.0405
6.0	-.317	-.0768	-.0275	-.0500
6.2	-.301	-.0924	-.0336	-.0587
6.4	-.287	-.1073	-.0390	-.0666
6.6	-.273	-.1215	-.0444	-.0738
6.8	-.262	-.1352	-.0495	-.0805
7.0	-.252	-.1481	-.0544	-.0866
7.2	-.242	-.1606	-.0591	-.0923
7.4	-.233	-.1723	-.0635	-.0975
7.6	-.225	-.1836	-.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	-.183	-.2514	-.0924	-.1291
9.2	-.180	-.2597	-.0954	-.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

$\alpha_3 = 1.00$

α_4	LAM 1	LAM 2	LAM 3	LAM 4
3.6	-1.253	.1772	.0000*	.2850*
3.6	-1.169	.1664	.4628*	.2490
3.8	-1.010	.1509	.0101	.1996
4.0	-.886	.1333	.0193	.1588
4.2	-.787	.1162	.0212	.1266
4.4	-.706	.0963	.0206	.0950
4.6	-.638	.0761	.0182	.0697
4.8	-.581	.0559	.0144	.0477
5.0	-.533	.0360	.9695*	.0285
5.2	-.492	.0146	.4383*	.0117
5.3	-.474	.5192*	.1584*	.4061*
5.4	-.445	-.0317*	-.0101**	-.0242**
5.5	-.442	-.0132	-.4176*	-.9946*
5.6	-.429	-.0222	-.7097*	-.0164
5.8	-.403	-.0395	-.0129	-.0282*
6.0	-.379	-.0562	-.0187	-.0388
6.2	-.358	-.0721	-.0244	-.0484
6.4	-.341	-.0873	-.0299	-.0571
6.6	-.325	-.1019	-.0352	-.0651
6.8	-.309	-.1158	-.0404	-.0723
7.0	-.297	-.1291	-.0453	-.0790
7.2	-.285	-.1419	-.0500	-.0852
7.4	-.275	-.1540	-.0545	-.0909
7.6	-.265	-.1658	-.0589	-.0962
7.8	-.256	-.1769	-.0630	-.1011
8.0	-.248	-.1878	-.0670	-.1058
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	-.0844	-.1249
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

$\alpha_3 = 1.10$

α_4	LAM 1	LAM 2	LAM 3	LAM 4
3.8	-1.219	.1582	.0000*	.2479
4.0	-1.108	.1489	.6035*	.2013
4.2	-.976	.1298	.0125	.1607
4.4	-.869	.1117	.0157	.1267
4.6	-.781	.0932	.0165	.0977
4.8	-.708	.0743	.0159	.0727
5.0	-.647	.0552	.0126	.0508
5.2	-.596	.0365	.9160*	.0316
5.4	-.552	.0181	.4839*	.0150
5.5	-.533	.9030*	.2486*	.7342*
5.6	-.517	.0997*	.0279*	.0795*
5.7	-.497	-.8629*	-.2479*	-.6726*
5.8	-.481	-.0173	-.5046*	-.0132
6.0	-.451	-.0340	-.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	-.288	-.1687	-.0577	-.0991
8.2	-.280	-.1794	-.0616	-.1038
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	-.2267	-.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	-.1428
10.8	-.203	-.2870	-.1002	-.1451
11.0	-.199	-.2934	-.1025	-.1473

ตารางที่ ง. (ต่อ)

$\alpha_3 = 1.50$

α_4	LAM 1	LAM 2	LAM 3	LAM 4
5.4	-1.112	.0951	.0000+	.1182
5.6	-1.103	.0886	.0000+	.1083
5.8	-1.042	.0773	.1949+	.0899
6.0	-.957	.0622	.3907+	.0677
6.2	-.885	.0471	.4441+	.0483
6.4	-.824	.0321	.3885+	.0313
6.6	-.688	.0566+	.0108++	.0494++
6.7	-.767	.9962+	.1538+	.9059+
6.8	-.718	-.0290+	-.48978	-.0256+
6.9	-.704	-.0446+	-.0768+	-.3882+
7.0	-.684	-.0115	-.2088+	-.9675+
7.2	-.647	-.0256	-.8989+	-.0210
7.4	-.615	-.0390	-.8156+	-.0312
7.6	-.585	-.0520	-.0115	-.0406
7.8	-.558	-.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	-.1022
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	-.2414	-.0740	-.1353
11.8	-.311	-.2478	-.0763	-.1377
12.0	-.305	-.2544	-.0786	-.1401
12.2	-.300	-.2607	-.0808	-.1424
12.4	-.295	-.2662	-.0827	-.1444
12.4	-.289	-.2726	-.0851	-.1466

$\alpha_3 = 1.60$

α_4	LAM 1	LAM 2	LAM 3	LAM 4
6.0	-1.081	.0757	.0000+	.0896
6.2	-1.074	.0698	.0000	.0814
6.4	-1.011	.0573	.1699+	.0634
6.6	-.937	.0430	.2684+	.0449
6.8	-.875	.0287	.2597+	.0285
7.0	-.746	.0422+	.62568+	.0378++
7.1	-.796	.777386+	.0969+	.7177+
7.2	-.774	-.0381+	-.46348	-.0309+
7.3	-.751	-.9924+	-.0858+	-.5279+
7.4	-.731	-.0127	-.1942+	-.0111
7.6	-.693	-.0258	-.6383+	-.0218
7.8	-.659	-.0386	-.7111+	-.0316
8.0	-.630	-.0511	-.0100	-.0406
8.2	-.602	-.0633	-.0131	-.0489
8.4	-.577	-.0752	-.0163	-.0566+
8.6	-.553	-.0866	-.0196	-.0636
8.8	-.534	-.0972	-.0227	-.0699
9.0	-.515	-.1084	-.0261	-.0763
9.2	-.496	-.1187	-.0294	-.0819
9.4	-.480	-.1288	-.0326	-.0872
9.6	-.465	-.1385	-.0358	-.0922
9.8	-.452	-.1480	-.0389	-.0969
10.0	-.438	-.1572	-.0420	-.1013
10.2	-.426	-.1659	-.0450	-.1054
10.4	-.415	-.1745	-.0479	-.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	-.0665	-.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	.0588
7.0	-1.001	.0412	.1027+	.0441
7.2	-.935	.0275	.1813+	.0288
7.4	-.878	.0142	.1142+	.0138
7.5	-.852	.7546+	.0696+	.7179+
7.6	-.825	-.0250+	-.25018	-.0232++
7.7	-.806	-.5469+	-.0619+	-.5000+
7.8	-.768	-.0119	-.3863+	-.0107
8.0	-.745	-.0245	-.3423+	-.0212
8.2	-.709	-.0367	-.5705+	-.0308
8.4	-.678	-.0487	-.8225+	-.0397
8.6	-.650	-.0603	-.0108	-.0478
8.8	-.622	-.0717	-.0138	-.0553+
9.0	-.598	-.0827	-.0167	-.0623
9.2	-.578	-.0933	-.0196	-.0686
9.4	-.557	-.1036	-.0226	-.0748
9.6	-.538	-.1136	-.0256	-.0804
9.8	-.521	-.1233	-.0286	-.0857
10.0	-.505	-.1329	-.0316	-.0907
10.2	-.488	-.1420	-.0346	-.0953
10.4	-.476	-.1509	-.0375	-.0997
10.6	-.463	-.1596	-.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	-.1374
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	-1.048	.0417	.0000+	.0456
7.4	-1.038	.0367	.0000+	.0396
7.6	-1.007	.0284	.0378+	.0298
7.8	-.948	.0155	.0646+	.0155
7.9	-.918	.9177+	.0498+	.9006+
8.0	-.882	.2914+	.0193+	.2801+
8.1	-.868	-.3291+	-.0254+	-.3102+
8.2	-.846	-.9427+	-.0826+	-.8721+
8.4	-.804	-.0215	-.2289+	-.0192
8.6	-.767	-.0333	-.4103+	-.0288
8.8	-.733	-.0446	-.6190+	-.0376
9.0	-.702	-.0559	-.8489+	-.0456
9.2	-.675	-.0668	-.0109	-.0531
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	-.434	-.1974	-.0506	-.1223
12.4	-.427	-.2043	-.0530	-.1252
12.6	-.418	-.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	-.1378
13.6	-.381	-.2417	-.0661	-.1400
13.8	-.374	-.2473	-.0681	-.1421
14.0	-.368	-.2530	-.0701	-.1442
14.2	-.362	-.2583	-.0720	-.1461
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	.6467+	.0150+	.6431+
8.5	-.946	.1239+	.41208	.1215+
8.6	-.917	-.5484+	-.0257+	-.5220+
8.7	-.893	-.0113	-.0657+	-.0106
8.8	-.871	-.0171	-.1167+	-.0158
9.0	-.831	-.0284	-.2475+	-.0254
9.2	-.794	-.0395	-.4100+	-.0343
9.4	-.761	-.0503	-.5975+	-.0424
9.6	-.731	-.0609	-.8046+	-.0500
9.8	-.703	-.0712	-.0103	-.0570
10.0	-.679	-.0811	-.0126	-.0635
10.2	-.656	-.0907	-.0150	-.0695
10.4	-.634	-.1002	-.0175	-.0752
10.6	-.614	-.1093	-.0200	-.0805
10.8	-.595	-.1183	-.0226	-.0855
11.0	-.576	-.1269	-.0251	-.0902
11.2	-.561	-.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	-.1478
15.2	-.376	-.2636	-.0711	-.1495

$\alpha_3 = 2.00$

α_4	LAM 1	LAM 2	LAM 3	LAM 4
8.6	-1.001	.8397+	.0000+	.6561+
8.8	-1.004	.4167+	.0000+	.4182+
8.9	-1.002	.2061+	.00018+	.2070+
9.0	-.993	-.1081+	-.04075	-.1076+
9.1	-.974	-.5675+	-.70758	-.5567+
9.2	-.950	-.0113	-.0272+	-.0109
9.4	-.905	-.0222	-.1012+	-.0207
9.6	-.865	-.0331	-.2125+	-.0298
9.8	-.828	-.0435	-.3537+	-.0381
10.0	-.796	-.0538	-.5187+	-.0458
10.2	-.766	-.0637	-.7027+	-.0529
10.4	-.738	-.0734	-.9016+	-.0595
10.6	-.713	-.0829	-.0111	-.0657
10.8	-.690	-.0920	-.0133	-.0714
11.0	-.670	-.1005	-.0154	-.0766
11.2	-.647	-.1097	-.0179	-.0819
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	-.0296	-.1033
12.4	-.557	-.1555	-.0312	-.1062
12.6	-.539	-.1644	-.0342	-.1104
12.8	-.527	-.1715	-.0365	-.1137
13.0	-.515	-.1784	-.0388	-.1168
13.2	-.504	-.1851	-.0410	-.1198
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	-.2216	-.0535	-.1351+
14.6	-.443	-.2271	-.0556	-.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	-.1472
15.8	-.403	-.2580	-.0663	-.1489+

ประวัติผู้เขียน

นางสาวนภัสวรรณ ชาติวัฒนานนท์ เกิดวันที่ 24 พฤษภาคม พ.ศ. 2515 สำเร็จการศึกษาปริญญาวิทยาศาสตร์บัณฑิต (วท.บ.) เกียรตินิยมอันดับ 2 สาขาสถิติประยุกต์ ภาควิชาคณิตศาสตร์และวิทยาการคอมพิวเตอร์ คณะวิทยาศาสตร์ประยุกต์ สถาบันเทคโนโลยีพระจอมเกล้า พระนครเหนือ ในปีการศึกษา 2536 และเข้าศึกษาต่อในหลักสูตรสถิติศาสตรมหาบัณฑิต ภาควิชาสถิติ คณะพาณิชยศาสตร์และการบัญชี จุฬาลงกรณ์มหาวิทยาลัย ในปีการศึกษา 2537