รายการอ้างอิง

ภาษาไทย

กัลยา วานิชบัญชา. การวิเคราะห์สถิติ:สถิติสำหรับการบริหารและวิจัย. พิมพ์ครั้งที่ 5. กรุงเทพมหานคร : สำนักพิมพ์จุฬาลงกรณ์มหาวิทยาลัย, 2545.

ธีระดา ภิญโญ. การศึกษาแบบมอนติคาร์โล:การเปรียบเทียบอำนาจการทดสอบเอฟเมื่อข้อมูลได้รับการแปลงในรูปแบบแตกต่างกัน ภายใต้ลักษณะการแจกแจงประชากร 3 แบบ. วิทยานิพนธ์ปริญญามหาบัณฑิต ภาควิชาวิจัยการศึกษา คณะครุศาสตร์ จุฬาลงกรณ์มหาวิทยาลัย, 2525.

ธีระพร วีระถาวร. ความน่าจะเป็นกับการประยุกต์. พิมพ์ครั้งที่ 2. กรุงเทพมหานคร : สำนักพิมพ์วิทยพัฒน์, 2539.

สุพล ดุรงค์วัฒนา. เอกสารประกอบการสอนวิชาการวางแผนการทดลองขั้นสูง. ภาควิชาสถิติ คณะพาณิชยศาสตร์และการบัญชี จุฬาลงกรณ์มหาวิทยาลัย, 2546.

อรไท สงวนสินธ์. การเปรียบเทียบการทดสอบเอฟและการทดสอบมอนติคาร์โลด้วยอัตราส่วนภาวะน่าจะเป็นสำหรับแผนการทดลองแบบสุ่มตลอด. วิทยานิพนธ์ปริญญามหาบัณฑิต ภาควิชาสถิติ คณะพาณิชยศาสตร์และการบัญชี จุฬาลงกรณ์มหาวิทยาลัย, 2545.

นภัสวรรณ ชาติวัฒนานนท์.ขนาดตัวอย่างสำหรับตัวสถิติทดสอบที ในกรณีที่ประชากรมีการแจกแจงไม่เป็นปกติ.วิทยานิพนธ์ปริญญามหาบัณฑิต ภาควิชาสถิติ บัณฑิตวิทยาลัย จุฬาลงกรณ์มหาวิทยาลัย, 2540

ภาษาอังกฤษ

Andreas,Krasue and M. The Basics of S and S-Plus. New York : Spinger Verlag, 2000.

Cochran,W.G.,and Cox,G.M. Experimental Design. New York : John Hiley and Sons, 1976.

Dean, A.M. and Voss, D.T. Design and Analvsis of Experiments. New York : Spinger Verlag, 1999.

Neter,Kutner,Nachtsheim and Wasserman. Applied Linear Statistical Models. The McGraw-Hill Companies.1996

Ramberg,J.R. *A Probability Distribution and It's Uses Fitting Data.* Technometrics. 21 (May 1979):201

ภาคผนวก

ภาคผนวก ก

ตัวอย่างการสร้างอิทธิพลของวิธีทดลอง

1. กรณีที่จำนวนวิธีทดลองเท่ากับ 3 จำนวนหน่วยทดลองในแต่ละวิธีทดลองเท่ากับ 4 ความแตกต่างระหว่างอิทธิพลของวิธีทดลองแตกต่างกันปานกลาง ค่า Φ อยู่ระหว่าง [1.5,3.0)

ถ้าค่า $\Phi = 2.286$ จะสามารถกำหนดอิทธิพลของวิธีทดลองได้ตามการคำนวณ

$$\Phi = D\sqrt{\frac{n}{2k\sigma^2}}$$

จะได้ดังนี้

ค่า Φ	C.V.%	σ^2	D	τ_i
2.286	20	100	28	$\tau_1 = -14 \quad \tau_2 = 0 \quad \tau_3 = 14$
	40	400	56	$\tau_1 = -28 \quad \tau_2 = 0 \quad \tau_3 = 28$
	60	900	84	$\tau_1 = -42 \quad \tau_2 = 0 \quad \tau_3 = 42$

2. กรณีที่จำนวนวิธีทดลองเท่ากับ 4 จำนวนหน่วยทดลองในแต่ละวิธีทดลองเท่ากับ 4 ความแตกต่างระหว่างอิทธิพลของวิธีทดลองแตกต่างกันปานกลาง ค่า Φ อยู่ระหว่าง [1.5,3.0)

ถ้าค่า $\Phi = 2.3$ จะสามารถกำหนดอิทธิพลของวิธีทดลองได้ตามการคำนวณ

$$\Phi = \frac{D}{2}\sqrt{\frac{n}{k\sigma^2}}$$

จะได้ดังนี้

ค่า Φ	C.V.%	σ^2	D	τ_i
2.3	20	100	46	$\tau_1 = -11.5 \quad \tau_2 = -11.5 \quad \tau_3 = 11.5 \quad \tau_4 = 11.5$
	40	400	92	$\tau_1 = -23 \quad \tau_2 = -23 \quad \tau_3 = 23 \quad \tau_4 = 23$
	60	900	138	$\tau_1 = -34.5 \quad \tau_2 = -34.5 \quad \tau_3 = 34.5 \quad \tau_4 = 34.5$

3. **กรณีที่จำนวนวิธีทดลองเท่ากับ 5 จำนวนหน่วยทดลองในแต่ละวิธีทดลองเท่ากับ 4 ความแตกต่างระหว่างอิทธิพลของวิธีทดลองแตกต่างกันปานกลาง ค่า Φ อยู่ระหว่าง** [1.5,3.0)

ถ้าค่า $\Phi = 2.254$ จะสามารถกำหนดอิทธิพลของวิธีทดลองได้ตามการคำนวณ

$$\Phi = \frac{D}{2}\sqrt{\frac{n}{k\sigma^2}}$$

จะได้ดังนี้

ค่า Φ	C.V.%	σ^2	D	τ_i
2.254	20	100	50.4	$\tau_1 = -12.6 \quad \tau_2 = -12.6 \quad \tau_3 = 0 \quad \tau_4 = 12.6 \quad \tau_5 = 12.6$
	40	400	100.8	$\tau_1 = -25.2 \quad \tau_2 = -25.2 \quad \tau_3 = 0 \quad \tau_4 = 25.2 \quad \tau_5 = 25.2$
	60	900	151.2	$\tau_1 = -37.8 \quad \tau_2 = -37.8 \quad \tau_3 = 0 \quad \tau_4 = 37.8 \quad \tau_5 = 37.8$

ภาคผนวก ข

ตารางแสดงฟังก์ชันการทำงานของโปรแกรม R ที่ใช้ในการศึกษาครั้งนี้

ฟังก์ชัน	หน้าที่การทำงาน
dim	กำหนดขนาดของเวกเตอร์ที่ใช้ในการเก็บข้อมูล
array(c(),dim)	ทำการเก็บข้อมูลในรูปเวกเตอร์
mean	คำนวณค่าเฉลี่ยของข้อมูล
med	คำนวณค่ามัธยฐานของข้อมูล
sum	หาผลรวมของข้อมูล
round(y,dig)	ทำการปัดเศษของข้อมูลที่ y โดยกำหนดตำแหน่งทศนิยมที่ต้องการ
sort()	ทำการเรียงลำดับข้อมูลจากน้อยไปมาก
ifelse	การเลือกชุดข้อมูลมาตามเงื่อนไขที่ตั้งไว้
repeat	การทำซ้ำจนกว่าจะได้ตรงตามเงื่อนไขที่กำหนด
runif	สร้างตัวเลขสุ่มที่มีค่าอยู่ในช่วง 0 ถึง 1

ตารางแสดงความหมายของสัญลักษณ์ต่างๆ ของโปรแกรม R ที่ใช้ในการศึกษาครั้งนี้

สัญลักษณ์	ความหมาย
k	จำนวนวิธีทดลอง
n	จำนวนหน่วยทดลองในแต่ละวิธีทดลอง
mu	ค่าเฉลี่ยรวม
std	ค่าส่วนเบี่ยงเบนมาตรฐาน
wc	ค่าวิกฤตของการทดสอบการแจกแจงแบบปกติ
T[i]	ค่าอิทธิพลของวิธีทดลองที่ i
D	ค่าความแตกต่างของอิทธิพลของวิธีทดลอง
Loops	จำนวนรอบของการทำซ้ำในแต่ละสถานการณ์
F.cal	ค่าสถิติทดสอบ F ของข้อมูลภายหลังการแปลงข้อมูล
Value.W	ค่าของการทดสอบการแจกแจงที่คำนวณได้ก่อนการแปลงข้อมูล
Value.Wt.Res	ค่าของการทดสอบการแจกแจงที่คำนวณได้หลังการแปลงข้อมูล
p.value.Ft	ค่า p-value ของสถิติทดสอบ F ภายหลังการแปลงข้อมูล

โปรแกรมการแก้ไขปัญหาข้อมูลตอบสนองของแผนการทดลองแบบสุ่มตลอดที่ไม่มีการแจกแจงแบบปกติ

(* กำหนดค่าต่าง ๆตามขอบเขตการวิจัย ***)**

```
k=4
n=4
std=10
mu=50
loops=500
wc=0.887

### Keep F-Test and  Number of Accept Ho After Transformation ###
p.value.Ft=array(,dim=c(loops,8))
count.Norm=array(,dim=c(loops,8))
count.Homo=array(,dim=c(loops,8))
value.W=array(,dim=c(loops,8))
value.Wt.Res=array(,dim=c(loops,8))
### Keep Data Y Before and After Transformation ###
count.N=array(,dim=c(loops,8))
collect.y=array(,dim=c(n,k,loops))
sk.R=array(,dim=c(loops))
ku.R=array(,dim=c(loops))

for (loop in 1:loops)
      {#loop#

       repeat
            {#Non-Normal#
            repeat
                  {#Homogeniety
                  repeat
                        { # Skew
                        repeat
                              {#Post
                  ### Tukey's Lambda ###
                        lam1=-0.392
                        lam2=-0.1258
                        lamb3=-0.038
                        lamb4=-0.0816
                        lamb1=lam1*std
                        lamb2=lam2/std

                  ### Generate P ###
                  p=runif(n*k)
                  err=(lamb1+((p^lamb3)-((1-p)^lamb4))/lamb2)
                  error=array(err,c(n,k))


                  ### Treatment Effect ###
                  D=46
                  T=c(-D/4,-D/4,D/4,D/4)

                  ### Genetate Y ###
                  y=array(,dim=c(n,k))
                  for (i in 1:n)
                        {
                         for (j in 1:k)
                              {
```

```
                              y[i,j]=mu+T[j]+error[i,j]
                              }
                        }

      ## Check Post Y ##
      post=0
      for (i in 1:n)
       {
            for (j in 1:k)
             {
                  if (y[i,j]>0)
                        {
                         post=post+1
                         collect.y[i,j,loop]=y[i,j]
                        } ### Collect Data Y Before Transform ###
             }
       }
       if (post==(k*n))break
} # Post

                  ##Compute Residuals##

            Res=array(,dim=c(n,k))
            mean.trt=array(,c(k))

            for (j in 1:k)
            {
                  mean.trt[j]=mean(y[,j])
                  for (i in 1:n)
                  {
                        Res[i,j]=y[i,j]-mean.trt[j]
                  }
            }
      residual=array(Res,c(n*k))

            ##check Sk&Ku for Residuals###
                  m2.R=sum((Res-mean(Res))^2)
                  m3.R=sum((Res-mean(Res))^3)
                  m4.R=sum((Res-mean(Res))^4)

      skew.R=(n*k)*m3.R/((k*n-1)*(n*k-2)*(sqrt(m2.R/(n*k-1)))^3)
      kurt.R=((m4.R*n*k*(n*k+1)/(n*k-1))-
(3*m2.R^2))/((sqrt(m2.R/(n*k-1)))^4*(n*k-2)*(n*k-3))

                  sk.R[loop]=skew.R
                  ku.R[loop]=kurt.R

      if ((skew.R>0.7)&&(skew.R<=1.4)&& (kurt.R<=6)&&(kurt.R>4))break
            }#skew

      ###Modify Levene's Test ###
      med<-array(,dim=c(k))
      for (j in 1:k)
            {
             med[j]<-median(y[,j])
            }
      d<-array(,dim=c(n,k))
      for (i in 1:n)
            {
             for (j in 1:k)
                  {
```

```
                d[i,j]<-abs(y[i,j]-med[j])
                }
        }
    mean.d<-array(,dim=c(k))
    for (j in 1:k)
        {
         mean.d[j]<-mean(d[,j])
        }

     strl<-sum(n*(mean.d-mean(d))^2)
     mtrl<-strl/(k-1)
     sel<-array(,dim=c(n,k))
    for (j in 1:k)
        {
         for (i in 1:n)
                {
                 sel[i,j]<-(d[i,j]-mean.d[j])^2
                }
        }
    mel<-sum(sel)/(k*(n-1))
    fl<-mtrl/mel

    ### compute p-value of Levene's Test ###
    p.value.L<-round(1-pf(fl,(k-1),k*(n-1)),dig=5)
    if (p.value.L>0.05) break
    }# HOMO


    b=array(,dim=c(8))
    a=c(0.5056,0.3290,0.2521,0.1939,0.1447,0.1005,0.0593,0.0196)
    ### shapiro-wilk test for Residual###
    sort.data=array(sort(residual),dim=c(1,k*n))

            s<-sum((sort.data-mean(residual))^2)

    for (l in 1:8)
        {
          b[l]<-a[l]*(sort.data[(n*k)-l+1]-sort.data[l])
        }
         bb<-sum(b)^2
    w<-bb/s

    if (w<wc && w>=0)break
    }#Non-Normal

### Box-Cox of Transformation ###
total.lambda=c(-2,-1.5,-1,-0.5,0,0.5,1.5,2)
data.transform=array(,dim=c(n,k))
    for (L in 1:8)
    {#for L
     lambda=total.lambda[L]
     transform=function(x)
          {return((1/lambda)*(x^lambda-1))}
     ln.transform=function(x)
          {return(log(x))}
     if (lambda==0)
          {
           data.transform=ln.transform(y)
          }
     else
          {
```

```
            data.transform=transform(y)
           }


##Compute Residuals After Transform ##

Res.transform=array(,dim=c(n,k))
mean.trt.R=array(,c(k))

for (j in 1:k)
 {
      mean.trt.R[j]=mean(data.transform[,j])
      for (i in 1:n)
      {
            Res.transform[i,j]=data.transform[i,j]-mean.trt.R[j]
       }
  }


### Check Normality After Transformation (for Residuals) ###
      bt=array(,dim=c(8))
      sort.data.Rt=array(sort(Res.transform),dim=c(1,k*n))

              st=sum((sort.data.Rt-mean(Res.transform))^2)

      for (l in 1:8)
            {
             bt[l]=a[l]*(sort.data.Rt[(n*k)-l+1]-sort.data.Rt[l])
            }
            bbt=sum(bt)^2
      wt.res=bbt/st


### Check Homogeneity After Transform ###
med.t<-array(,dim=c(k))
      for (j in 1:k)
            {
             med.t[j]<-median(data.transform[,j])
            }
      d.t<-array(,dim=c(n,k))
      for (i in 1:n)
            {
             for (j in 1:k)
                  {
                   d.t[i,j]<-abs(data.transform[i,j]-med.t[j])
                  }
            }
      mean.dt<-array(,dim=c(k))
      for (j in 1:k)
            {
             mean.dt[j]<-mean(d.t[,j])
            }

       strl.t<-sum(n*(mean.dt-mean(d.t))^2)
       mtrl.t<-strl.t/(k-1)
       sel.t<-array(,dim=c(n,k))
      for (j in 1:k)
            {
             for (i in 1:n)
                  {
                   sel.t[i,j]<-(d.t[i,j]-mean.dt[j])^2
```

```
                }
            }
        mel.t<-sum(sel.t)/(k*(n-1))
        fl.t<-mtrl.t/mel.t

        ### compute p-value of Levene's Test After Transform ###
        p.value.Lt<-round(1-pf(fl.t,(k-1),k*(n-1)),dig=5)


### F-test After Transformation ###
mean.t.y<-mean(data.transform)
sum.t.y<-sum(data.transform)
CM<-(sum.t.y^2)/(n*k)
SST<-sum(data.transform^2)-CM
ss.tr<-array(,dim=c(k))
for (j in 1:k)
      {
       ss.tr[j]<-sum(data.transform[,j])^2
      }
SSTr<-(sum(ss.tr)/n)-CM
SSE<-SST-SSTr
F.cal<-(SSTr/(k-1))/(SSE/(k*(n-1)))

##Compute p-value of F-Test ###
p.value.F<-round(1-pf(F.cal,k-1,k*(n-1)),dig=5)


            ## Check Assumption ##
        if (wt.res>wc)
         {
           if (p.value.Lt>0.05)
               {
                p.value.Ft[loop,L]=p.value.F
                }
               else
               {
                p.value.Ft[loop,L]="N"
               }
          }
            else
               {
                p.value.Ft[loop,L]="N"
               }
         if (wt.res>wc)
               {count.Norm[loop,L]=1}
        else
               {count.Norm[loop,L]=0}

         if (p.value.Lt>0.05)
               {count.Homo[loop,L]=1}
        else
               {count.Homo[loop,L]=0}

               value.W[loop,L]=w
               value.Wt.Res[loop,L]=wt.res

}# For L

}#loop
```

```
## Calculate Proportion of Normality ##
p.p.normal=array(,dim=c(1,8))
for (LL in 1:8)
      {
       p.p.normal[1,LL]=round(sum(count.Norm[,LL])/loops,dig=5)
      }
print (p.p.normal[1,])

## Calculate Proportion of Homogeneity ##
p.p.Homo=array(,dim=c(1,8))
for (LL in 1:8)
      {
       p.p.Homo[1,LL]=round(sum(count.Homo[,LL])/loops,dig=5)
      }
print (p.p.Homo[1,])


## Compute Power of F-test (0.05)##
all.n=array(,dim=c(1,8))
p.p.F0.05=array(,dim=c(1,8))
power.F0.05=array(,dim=c(1,8))

      for (LL in 1:8)
            {
             count.F0.05=ifelse(p.value.Ft[,LL]<0.05,1,0)
             p.p.F0.05[1,LL]=sum(count.F0.05)
             count.N=ifelse(p.value.Ft[,LL]=="N",1,0)
             all.n[1,LL]=sum(count.N)
             power.F0.05[1,LL]=round(p.p.F0.05[1,LL]/(loops-
all.n[1,LL]),dig=5)
            }
      print(power.F0.05[1, ])
      print(loops-all.n)
      print ("****************************")
```

ภาคผนวก ค

ตารางแสดงค่าของการควบคุมความผิดพลาดประเภทที่ 1

$$\left(0, \alpha_0 + Z\alpha^* \sqrt{\frac{\alpha_0(1-\alpha_0)}{n^*}}\right)$$

n	0.05	n	0.05	n	0.05	n	0.05
50	0.1007	81	0.0898	111	0.0840	141	0.0802
51	0.1002	82	0.0896	112	0.0839	142	0.0801
52	0.0997	83	0.0894	113	0.0837	143	0.0800
53	0.0992	84	0.0891	114	0.0836	144	0.0799
54	0.0988	85	0.0889	115	0.0834	145	0.0798
55	0.0983	86	0.0887	116	0.0833	146	0.0797
56	0.0979	87	0.0884	117	0.0831	147	0.0796
57	0.0975	88	0.0882	118	0.0830	148	0.0795
58	0.0971	89	0.0880	119	0.0829	149	0.0794
59	0.0967	90	0.0878	120	0.0827	150	0.0793
60	0.0963	91	0.0876	121	0.0826	151	0.0792
61	0.0959	92	0.0874	122	0.0825	152	0.0791
62	0.0955	93	0.0872	123	0.0823	153	0.0790
63	0.0952	94	0.0870	124	0.0822	154	0.0789
64	0.0948	95	0.0868	125	0.0821	155	0.0788
65	0.0945	96	0.0866	126	0.0819	156	0.0787
66	0.0941	97	0.0864	127	0.0818	157	0.0786
67	0.0938	98	0.0862	128	0.0817	158	0.0785
68	0.0935	99	0.0860	129	0.0816	159	0.0784
69	0.0932	100	0.0859	130	0.0814	160	0.0783
70	0.0929	101	0.0857	131	0.0813	161	0.0783
71	0.0925	102	0.0855	132	0.0812	162	0.0782
72	0.0923	103	0.0853	133	0.0811	163	0.0781
73	0.0920	104	0.0852	134	0.0810	164	0.0780
74	0.0917	105	0.0850	135	0.0809	165	0.0779
75	0.0914	106	0.0848	136	0.0807	166	0.0778
76	0.0911	107	0.0847	137	0.0806	167	0.0777
77	0.0909	108	0.0845	138	0.0805	168	0.0777
78	0.0906	109	0.0843	139	0.0804	169	0.0776
79	0.0903	110	0.0842	140	0.0803	170	0.0775
80	0.0901						

ตารางแสดงค่าของการควบคุมความผิดพลาดประเภทที่ 1 (ต่อ)

$$\left(0, \alpha_0 + Z\alpha^{*}\sqrt{\frac{\alpha_0(1-\alpha_0)}{n^{*}}}\right)$$

n	0.05	n	0.05	n	0.05	n	0.05
171	0.0774	201	0.0753	231	0.0736	261	0.0722
172	0.0773	202	0.0752	232	0.0735	262	0.0721
173	0.0773	203	0.0752	233	0.0735	263	0.0721
174	0.0772	204	0.0751	234	0.0734	264	0.0721
175	0.0771	205	0.0750	235	0.0734	265	0.0720
176	0.0770	206	0.0750	236	0.0733	266	0.0720
177	0.0769	207	0.0749	237	0.0733	267	0.0719
178	0.0769	208	0.0749	238	0.0732	268	0.0719
179	0.0768	209	0.0748	239	0.0732	269	0.0719
180	0.0767	210	0.0747	240	0.0731	270	0.0718
181	0.0766	211	0.0747	241	0.0731	271	0.0718
182	0.0766	212	0.0746	242	0.0730	272	0.0717
183	0.0765	213	0.0746	243	0.0730	273	0.0717
184	0.0764	214	0.0745	244	0.0730	274	0.0717
185	0.0764	215	0.0745	245	0.0729	275	0.0716
186	0.0763	216	0.0744	246	0.0729	276	0.0716
187	0.0762	217	0.0743	247	0.0728	277	0.0715
188	0.0761	218	0.0743	248	0.0728	278	0.0715
189	0.0761	219	0.0742	249	0.0727	279	0.0715
190	0.0760	220	0.0742	250	0.0727	280	0.0714
191	0.0759	221	0.0741	251	0.0726	281	0.0714
192	0.0759	222	0.0741	252	0.0726	282	0.0713
193	0.0758	223	0.0740	253	0.0725	283	0.0713
194	0.0757	224	0.0740	254	0.0725	284	0.0713
195	0.0757	225	0.0739	255	0.0725	285	0.0712
196	0.0756	226	0.0738	256	0.0724	286	0.0712
197	0.0755	227	0.0738	257	0.0724	287	0.0712
198	0.0755	228	0.0737	258	0.0723	288	0.0711
199	0.0754	229	0.0737	259	0.0723	289	0.0711
200	0.0754	230	0.0736	260	0.0722	290	0.0711

ตารางแสดงค่าของการควบคุมความผิดพลาดประเภทที่ 1 (ต่อ)

$$\left(0, \alpha_0 + Z\alpha^{*}\sqrt{\frac{\alpha_0(1-\alpha_0)}{n^{*}}}\right)$$

n	0.05	n	0.05	n	0.05	n	0.05
291	0.0710	321	0.0700	351	0.0691	381	0.0684
292	0.0710	322	0.0700	352	0.0691	382	0.0683
293	0.0709	323	0.0699	353	0.0691	383	0.0683
294	0.0709	324	0.0699	354	0.0691	384	0.0683
295	0.0709	325	0.0699	355	0.0690	385	0.0683
296	0.0708	326	0.0699	356	0.0690	386	0.0682
297	0.0708	327	0.0698	357	0.0690	387	0.0682
298	0.0708	328	0.0698	358	0.0689	388	0.0682
299	0.0707	329	0.0698	359	0.0689	389	0.0682
300	0.0707	330	0.0697	360	0.0689	390	0.0682
301	0.0707	331	0.0697	361	0.0689	391	0.0681
302	0.0706	332	0.0697	362	0.0688	392	0.0681
303	0.0706	333	0.0696	363	0.0688	393	0.0681
304	0.0706	334	0.0696	364	0.0688	394	0.0681
305	0.0705	335	0.0696	365	0.0688	395	0.0680
306	0.0705	336	0.0696	366	0.0687	396	0.0680
307	0.0705	337	0.0695	367	0.0687	397	0.0680
308	0.0704	338	0.0695	368	0.0687	398	0.0680
309	0.0704	339	0.0695	369	0.0687	399	0.0679
310	0.0704	340	0.0694	370	0.0686	400	0.0679
311	0.0703	341	0.0694	371	0.0686	401	0.0679
312	0.0703	342	0.0694	372	0.0686	402	0.0679
313	0.0703	343	0.0694	373	0.0686	403	0.0679
314	0.0702	344	0.0693	374	0.0685	404	0.0678
315	0.0702	345	0.0693	375	0.0685	405	0.0678
316	0.0702	346	0.0693	376	0.0685	406	0.0678
317	0.0701	347	0.0692	377	0.0685	407	0.0678
318	0.0701	348	0.0692	378	0.0684	408	0.0677
319	0.0701	349	0.0692	379	0.0684	409	0.0677
320	0.0700	350	0.0692	380	0.0684	410	0.0677

ตารางแสดงค่าของการควบคุมความผิดพลาดประเภทที่ 1 (ต่อ)

$$\left(0, \alpha_0 + Z\alpha^* \sqrt{\frac{\alpha_0(1-\alpha_0)}{n^*}}\right)$$

n	0.05	n	0.05	n	0.05
411	0.0677	441	0.0671	471	0.0665
412	0.0677	442	0.0671	472	0.0665
413	0.0676	443	0.0670	473	0.0665
414	0.0676	444	0.0670	474	0.0665
415	0.0676	445	0.0670	475	0.0665
416	0.0676	446	0.0670	476	0.0664
417	0.0676	447	0.0670	477	0.0664
418	0.0675	448	0.0669	478	0.0664
419	0.0675	449	0.0669	479	0.0664
420	0.0675	450	0.0669	480	0.0664
421	0.0675	451	0.0669	481	0.0663
422	0.0675	452	0.0669	482	0.0663
423	0.0674	453	0.0668	483	0.0663
424	0.0674	454	0.0668	484	0.0663
425	0.0674	455	0.0668	485	0.0663
426	0.0674	456	0.0668	486	0.0663
427	0.0673	457	0.0668	487	0.0662
428	0.0673	458	0.0668	488	0.0662
429	0.0673	459	0.0667	489	0.0662
430	0.0673	460	0.0667	490	0.0662
431	0.0673	461	0.0667	491	0.0662
432	0.0672	462	0.0667	492	0.0662
433	0.0672	463	0.0667	493	0.0661
434	0.0672	464	0.0666	494	0.0661
435	0.0672	465	0.0666	495	0.0661
436	0.0672	466	0.0666	496	0.0661
437	0.0672	467	0.0666	497	0.0661
438	0.0671	468	0.0666	498	0.0661
439	0.0671	469	0.0666	499	0.0660
440	0.0671	470	0.0665	500	0.0660

ภาคผนวก ง

ตารางที่1 *ambda parameters for given values of skewness (α_3) and kurtosis (α_4) when μ = 0 and σ = 1.*

α_3 = 0.0

α_4	LAM 1	LAM 2	LAM 3	LAM 4
1.8	.0	.5774	1.0000	1.0000
2.0	.0	.4952	.5843	.5843
2.2	.0	.4197	.4092	.4092
2.4	.0	.3533	.3032	.3032
2.6	.0	.2949	.2303	.2303
2.8	.0	.2433	.1765	.1765
3.0	.0	.1974	.1349	.1349
3.2	.0	.1563	.1016	.1016
3.4	.0	.1191	.0742	.0742
3.6	.0	.0852	.0512	.0512
3.8	.0	.0545	.0317	.0317
4.0	.0	.0262	.0148	.0148
4.1	.0	.0128	.7140+	.7140+
4.2	.0	-.0659+	-.0363+	-.0363+
4.3	.0	-.0123	-.6706+	-.6706+
4.4	.0	-.0241	-.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	-.1684	-.0802	-.0802
6.2	.0	-.1823	-.0858	-.0858
6.4	.0	-.1954	-.0910	-.0910
6.6	.0	-.2077	-.0958	-.0958
6.8	.0	-.2194	-.1003	-.1003
7.0	.0	-.2306	-.1045	-.1045
7.2	.0	-.2414	-.1085	-.1085
7.4	.0	-.2518	-.1123	-.1123
7.6	.0	-.2615	-.1158	-.1158
7.8	.0	-.2709	-.1191	-.1191
8.0	.0	-.2800	-.1223	-.1223
8.2	.0	-.2887	-.1253	-.1253
8.4	.0	-.2969	-.1281	-.1281
8.6	.0	-.3050	-.1308	-.1308
8.8	.0	-.3128	-.1334	-.1334
9.0	.0	-.3203	-.1359	-.1359

α_3 = 0.05

α_4	LAM 1	LAM 2	LAM 3	LAM 4
1.8	-1.703	.2061	.0000	.9502*
2.0	-1.229	.3122	.0505	.7603
2.2	-.802	.3314	.1128	.5802
2.4	-.375	.3328	.1876	.3941
2.6	-.143	.2924	.1973	.2605
2.8	-.083	.2429	.1625	.1903
3.0	-.059	.1975	.1276	.1425
3.2	-.046	.1565	.0974	.1061
3.4	-.038	.1194	.0718	.0770
3.6	-.033	.0856	.0499	.0530
3.8	-.027	.0548	.0311	.0327
4.0	-.026	.0264	.0146	.0153
4.1	-.024	.0132	.7184+	.7504+
4.2	-.024	.0704+	.0380+	.0397+
4.3	-.022	-.0120	-.6386+	-.6603+
4.4	-.022	-.0238	-.0126	-.0131
4.6	-.018	-.0462	-.0240	-.0248
4.8	-.019	-.0671	-.0342	-.0354
5.0	-.016	-.0867	-.0435	-.0448
5.2	-.016	-.1050	-.0519	-.0534
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	-.959+	-.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

α_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	.3164	.1477	.4116
2.6	-.269	.2863	.1678	.2831
2.8	-.164	.2417	.1484	.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	.0558	.0308	.0342
4.0	-.049	.0276	.0149	.0163
4.1	-.048	.0142	.7606+	.8302+
4.2	-.046	.1440+	.0762+	.0828+
4.3	-.044	-.0109	-.5703+	-.6174+
4.4	-.041	-.0227	-.0118	-.0127
4.6	-.037	-.0452	-.0231	-.0247
4.8	-.036	-.0661	-.0332	-.0354
5.0	-.033	-.0857	-.0424	-.0450
5.2	-.032	-.1040	-.0507	-.0537
5.4	-.030	-.1213	-.0584	-.0616
5.6	-.028	-.1375	-.0654	-.0688
5.8	-.027	-.1530	-.0719	-.0755
6.0	-.027	-.1674	-.0778	-.0816
6.2	-.025	-.1811	-.0834	-.0872
6.4	-.024	-.1943	-.0886	-.0925
6.6	-.023	-.2066	-.0934	-.0973
6.8	-.023	-.2184	-.0979	-.1019
7.0	-.022	-.2297	-.1021	-.1062
7.2	-.021	-.2405	-.1061	-.1102
7.4	-.020	-.2507	-.1099	-.1139
7.6	-.020	-.2606	-.1134	-.1175
7.8	-.020	-.2699	-.1167	-.1208
8.0	-.019	-.2791	-.1199	-.1240
8.2	-.019	-.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

α_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	.0314	.7204
2.2	-.940	.3056	.0782	.5623
2.4	-.617	.3031	.1215	.4194
2.6	-.376	.2791	.1435	.2994
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	.8378+	.9564+
4.2	-.069	.3217+	.1667+	.1890+
4.3	-.066	-.9113+	-.4680+	-.5278+
4.4	-.063	-.0210	-.0107	-.0120
4.6	-.056	-.0435	-.0218	-.0242
4.8	-.055	-.0644	-.0318	-.0351
5.0	-.051	-.0842	-.0410	-.0449
5.2	-.048	-.1025	-.0493	-.0537
5.4	-.045	-.1198	-.0569	-.0617
5.6	-.043	-.1361	-.0639	-.0690
5.8	-.042	-.1514	-.0703	-.0757
6.0	-.040	-.1660	-.0763	-.0819
6.2	-.038	-.1798	-.0819	-.0876
6.4	-.037	-.1928	-.0870	-.0929
6.6	-.035	-.2053	-.0919	-.0978
6.8	-.034	-.2172	-.0964	-.1024
7.0	-.033	-.2284	-.1006	-.1067
7.2	-.032	-.2392	-.1046	-.1107
7.4	-.031	-.2496	-.1084	-.1145
7.6	-.030	-.2593	-.1119	-.1180
7.8	-.029	-.2688	-.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

α_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	.4246
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	.0198
4.1	-.097	.0185	.9467+	.0113
4.2	-.093	.5707+	.2894+	.3429+
4.3	-.089	-.6641+	-.3342+	-.3929+
4.4	-.085	-.0185	-.9261+	-.0108
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	-.1028
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	-.3014	-.1255	-.1336
8.8	-.035	-.3092	-.1281	-.1362
9.0	-.034	-.3168	-.1306	-.1387
9.2	-.034	-.3241	-.1330	-.1411

α_3 = 0.25

α_4	LAM 1	LAM 2	LAM 3	LAM 4
2.0	-1.465	.2748	.0105	.7034
2.2	-1.084	.2847	.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+	.5467+
4.3	-.113	-.3676+	-.1713+	-.2103+
4.4	-.108	-.0154	-.7548+	-.9175+
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

The parameter values given in this table are for a variate with zero mean and unit variance. The procedure for adjusting the parameters to reflect a different mean or variance is given in Section 3. A plus sign (+) next to a tabled value indicates that the value has two leading zeroes and should be multiplied by 10^{-2}. Similarly, a dollar sign ($) next to a tabled value indicates that the value should be multiplied by 10^{-4}. An asterisk (*) next to a tabled value of λ_i indicates that the difference between the calculated and specified values of α_i, i.e. $|\alpha_i(\lambda_3,\lambda_4) - \alpha_i|$, is somewhat greater than 0.01. See Section 4 for a discussion of the construction and accuracy of this table.

ตารางที่1 (ต่อ)

$\alpha_3 = 0.30$

α_4	LAM 1	LAM 2	LAM 3	LAM 4
2.0	-1.558	.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	.2323	.0983	.2495
3.0	-.362	.1991	.0925	.1859
3.2	-.288	.1641	.0796	.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+	.8035+
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	-.0949	-.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	-.724	.2528	.0775	.3423
2.8	-.550	.2298	.0873	.2606
3.0	-.427	.1996	.0854	.1961
3.2	-.343	.1665	.0758	.1462
3.4	-.285	.1333	.0625	.1072
3.6	-.243	.1014	.0482	.0760
3.8	-.213	.0714	.0340	.0505
4.0	-.191	.0434	.0206	.0293
4.2	-.172	.0173	.8158+	.0112
4.3	-.163	.4870+	.2293+	.3090+
4.4	-.156	-.7105+	-.3332+	-.4431+
4.5	-.151	-.0187	-.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	-.064	-.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	-1.354	.2582	.0129	.5683
2.4	-1.043	.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	-.280	.1060	.0482	.0824
3.8	-.248	.0764	.0351	.0558
4.0	-.222	.0485	.0223	.0337
4.2	-.200	.0224	.0103	.0149
4.3	-.190	.0100	.4597+	.6521+
4.4	-.182	-.0397+	-.0182+	-.0254+*
4.5	-.174	-.0136	-.6204+*	-.8533+
4.6	-.166	-.0248	-.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	-.0654
5.8	-.115	-.1352	-.0591	-.0727
6.0	-.111	-.1501	-.0651	-.0794
6.2	-.106	-.1643	-.0708	-.0856
6.4	-.102	-.1778	-.0761	-.0913
6.6	-.098	-.1906	-.0811	-.0966
6.8	-.094	-.2028	-.0857	-.1014
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	-.2558	-.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	-.2988	-.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	.2248	.0663	.2840
3.0	-.565	.2003	.0707	.2184
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	-.236	.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	-.1595	-.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	-.1028	-.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	-.639	.2006	.0630	.2307
3.2	-.525	.1742	.0625	.1768
3.4	-.440	.1454	.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	-.088	-.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	.0063+	.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	.0467	.1070
3.8	-.372	.0940	.0376	.0767
4.0	-.330	.0670	.0275	.0514
4.2	-.298	.0413	.0172	.0301
4.4	-.265	.0170	.7149+	.0118
4.5	-.257	.5355+	.2258+	.3484+
4.6	-.247	-.5954+	-.2515+	-.3975+
4.7	-.237	-.0169	-.7168+	-.0111
4.8	-.227	-.0276	-.0117	-.0178
5.0	-.213	-.0480	-.0203	-.0300
5.2	-.200	-.0671	-.0283	-.0408
5.4	-.187	-.0852	-.0359	-.0505
5.6	-.177	-.1024	-.0430	-.0593
5.8	-.165	-.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	-.1294
8.6	-.104	-.2784	-.1100	-.1324
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

The parameter values given in this table are for a variate with zero mean and unit variance. The procedure for adjusting the parameters to reflect a different mean or variance is given in Section 3. A plus sign (+) next to a tabled value indicates that the value has two leading zeroes and should be multiplied by 10^{-2}. Similarly, a dollar sign ($) next to a tabled value indicates that the value should be multiplied by 10^{-4}. An asterisk (*) next to a tabled value of λ_i indicates that the difference between the calculated and specified values of α_3, i.e. $|\alpha_3(\lambda_3, \lambda_4) - \alpha_3|$, is somewhat greater than 0.01. See Section 4 for a discussion of the construction and accuracy of this table.

. ตารางที่1 (ต่อ)

$\alpha_3 = 0.60$

α_4	LAM 1	LAM 2	LAM 3	LAM 4
2.4	-1.411	.2347	.0000*	.4951+
2.6	-1.198	.2206	.0171	.4098
2.8	-.972	.2100	.0355	.3265
3.0	-.800	.2009	.0467	.2503
3.2	-.665	.1791	.0514	.2020
3.4	-.562	.1539	.0504	.1554
3.6	-.482	.1273	.0454	.1171
3.8	-.420	.1005	.0379	.0854
4.0	-.372	.0740	.0289	.0589
4.2	-.335	.0486	.0194	.0366
4.4	-.302	.0248	.9911+	.0175
4.5	-.289	.0120	.5215+	.8965+
4.6	-.277	.1492+	.0611+	.1025+
4.7	-.266	-.9531+	-.3916+	-.6425+
4.8	-.256	-.0202	-.8326+	-.0134
5.0	-.238	-.0407	-.0168	-.0261
5.2	-.222	-.0600	-.0248	-.0373
5.4	-.209	-.0782	-.0323	-.0474
5.6	-.197	-.0956	-.0394	-.0565
5.8	-.187	-.1110	-.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	LAM 1	LAM 2	LAM 3	LAM 4
2.6	-1.329	.2240	.3908+	.4318
2.8	-1.076	.2157	.0246	.3483
3.0	-.889	.2010	.0380	.2742
3.2	-.744	.1812	.0449	.2162
3.4	-.630	.1582	.0464	.1682
3.6	-.542	.1330	.0435	.1283
3.8	-.472	.1072	.0377	.0952
4.0	-.418	.0813	.0300	.0674
4.2	-.374	.0564	.0215	.0440
4.4	-.338	.0323	.0126	.0239
4.5	-.324	.0207	.0137+	.0150
4.6	-.310	.9399+	.3719+	.6660+
4.7	-.297	-.1593+	-.0634+	-.1106+
4.8	-.285	-.0123	-.4921+	-.8391+
5.0	-.265	-.0320	-.0132	-.0216
5.2	-.248	-.0524	-.0211	-.0334
5.4	-.231	-.0707	-.0286	-.0438
5.6	-.219	-.0880	-.0356	-.0532
5.8	-.209	-.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	-.0946
7.0	-.161	-.1874	-.0746	-.0997
7.2	-.155	-.1991	-.0790	-.1045
7.4	-.150	-.2100	-.0831	-.1089
7.6	-.145	-.2204	-.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	-.1274
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	LAM 1	LAM 2	LAM 3	LAM 4
2.6	-1.368	.2217	.0000*	.4353+
2.8	-1.194	.2132	.0130	.3651
3.0	-.987	.2008	.0286	.2910
3.2	-.828	.1833	.0378	.2319
3.4	-.704	.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	.0406	.0151	.0312
4.6	-.344	.0178	.6787+	.0130
4.7	-.331	.6799+	.2607+	.8872+
4.8	-.317	-.3917+	-.1512+	-.2750+
4.9	-.305	-.0144	-.5578+	-.9893+
5.0	-.294	-.0245	-.9565+	-.0166
5.2	-.276	-.0441	-.0173	-.0289
5.4	-.257	-.0626	-.0247	-.0398
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	-.1554	-.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	-.1404
9.6	-.125	-.3011	-.1144	-.1429
9.8	-.122	-.3081	-.1168	-.1452

$\alpha_3 = 0.75$

α_4	LAM 1	LAM 2	LAM 3	LAM 4
2.8	-1.334	.2104	.0000	.3903
3.0	-1.097	.2003	.0183	.3119
3.2	-.921	.1850	.0299	.2492
3.4	-.785	.1658	.0360	.1974
3.6	-.677	.1440	.0375	.1542
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+	.1033+	.3503+
4.9	-.339	-.5509+	-.2061+	-.3916+
5.0	-.324	-.0157	-.5915+	-.0109
5.2	-.306	-.0353	-.0134	-.0230
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	LAM 1	LAM 2	LAM 3	LAM 4
3.0	-1.225	.1996	.6847+	.3356
3.2	-1.025	.1864	.0211	.2687
3.4	-.874	.1692	.0295	.2143
3.6	-.754	.1492	.0333	.1691
3.8	-.657	.1272	.0333	.1310
4.0	-.582	.1042	.0303	.0989
4.2	-.515	.0818	.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+	-.8531+
5.1	-.349	-.0164	-.5901+	-.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	-.2104	-.0799	-.1117
8.0	-.180	-.2205	-.0836	-.1157
8.2	-.174	-.2304	-.0872	-.1195
8.4	-.165	-.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	LAM 1	LAM 2	LAM 3	LAM 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	.0204	.0582
4.6	-.472	.0451	.0146	.0370
4.8	-.430	.0238	.8001+	.0185
4.9	-.413	.0134	.4581+	.0182
5.0	-.398	.3583+	.1211+	.2612+
5.1	-.383	-.6781+	-.2345+	-.4896+
5.2	-.370	-.0165	-.5808+	-.0110
5.4	-.344	-.0353	-.0127	-.0248
5.6	-.324	-.0531	-.0193	-.0356
5.8	-.305	-.0703	-.0258	-.0457
6.0	-.290	-.0868	-.0318	-.0548
6.2	-.275	-.1019	-.0378	-.0631
6.4	-.262	-.1168	-.0435	-.0707
6.6	-.251	-.1307	-.0488	-.0776
6.8	-.241	-.1442	-.0539	-.0848
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	-.2748	-.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

The parameter values given in this table are for a variate with zero mean and unit variance. The procedure for adjusting the parameters to reflect a different mean or variance is given in Section 3. A plus sign (+) next to a tabled value indicates that the value has two leading zeroes and should be multiplied by 10^{-2}. Similarly, a dollar sign ($) next to a tabled value indicates that the value should be multiplied by 10^{-4}. An asterisk (*) next to a tabled value of λ_j indicates that the difference between the calculated and specified values of α_j, i.e. $|\alpha_j(\lambda_3, \lambda_4) - \alpha_j|$, is somewhat greater than 0.01. See Section 4 for a discussion of the construction and accuracy of this table.

ตารางที่1 (ต่อ)

α_3 = 0.90

α_4	LAM 1	LAM 2	LAM 3	LAM 4
3.2	-1.277	.1800	.0000	.3160
3.4	-1.085	.1751	.0133	.2548
3.6	-.933	.1586	.0218	.2039
3.8	-.818	.1397	.0260	.1615
4.0	-.717	.1193	.0269	.1258
4.2	-.639	.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	.4320+	.0102
5.1	-.422	.3339+	.1111+	.2526+
5.2	-.407	-.6388+	-.2158+	-.4735+
5.3	-.394	-.0159	-.5428+	-.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	-.0334	-.0587
6.4	-.287	-.1073	-.0390	-.0668
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	-.1838	-.0678	-.1024
7.8	-.218	-.1947	-.0718	-.1070
8.0	-.212	-.2051	-.0756	-.1113
8.2	-.205	-.2151	-.0793	-.1153
8.4	-.199	-.2246	-.0828	-.1190
8.6	-.194	-.2340	-.0862	-.1226
8.8	-.189	-.2428	-.0894	-.1258
9.0	-.185	-.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

α_3 = 1.00

α_4	LAM 1	LAM 2	LAM 3	LAM 4
3.4	-1.253	.1772	.0000+	.2854+
3.6	-1.169	.1664	.4828+	.2490
3.8	-1.010	.1509	.0141	.1996
4.0	-.886	.1333	.0193	.1588
4.2	-.787	.1142	.0212	.1244
4.4	-.706	.0943	.0206	.0950
4.6	-.638	.0741	.0182	.0697
4.8	-.581	.0539	.0144	.0477
5.0	-.533	.0340	.9695+	.0285
5.2	-.492	.0146	.4383+	.0117
5.3	-.474	.5192+	.1584+	.4061+
5.4	-.458	-.0317+	-.0101+*	-.0242+*
5.5	-.442	-.0132	-.4176+	-.9946+
5.6	-.429	-.0222	-.7097+	-.0168
5.8	-.403	-.0395	-.0129	-.0282+
6.0	-.379	-.0562	-.0187	-.0388
6.2	-.358	-.0721	-.0248	-.0488
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

α_3 = 1.10

α_4	LAM 1	LAM 2	LAM 3	LAM 4
3.8	-1.215	.1582	.0000+	.2379
4.0	-1.108	.1459	.6035+	.2013
4.2	-.974	.1294	.0125	.1607
4.4	-.869	.1117	.0157	.1267
4.6	-.781	.0932	.0165	.0977
4.8	-.708	.0743	.0154	.0727
5.0	-.647	.0552	.0128	.0508
5.2	-.596	.0365	.9168+	.0318
5.4	-.552	.0181	.4839+	.0150
5.5	-.532	.9030+	.2484+	.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	-.289	-.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	-.2936	-.1025	-.1473

α_3 = 1.20

α_4	LAM 1	LAM 2	LAM 3	LAM 4
4.2	-1.183	.1407	.0000+	.1997
4.4	-1.003	.1278	.5096+	.1675
4.6	-.965	.1113	.9968+	.1329
4.8	-.876	.0941	.0122	.1036
5.0	-.792	.0764	.0124	.0784
5.2	-.723	.0586	.0112	.0565
5.4	-.660	.0408	.8705+	.0372
5.6	-.615	.0233	.5411+	.0202
5.7	-.597	.0146	.3525+	.0124
5.8	-.577	.6088+	.1515+	.5050+
5.9	-.558	-.2319+	-.0594+	-.1884+
6.0	-.542	-.0962+	-.0205+	-.0788+
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	-.318	-.1695	-.0558	-.1010
8.6	-.305	-.1796	-.0594	-.1055
8.8	-.296	-.1896	-.0630	-.1098
9.0	-.287	-.1990	-.0664	-.1137
9.2	-.280	-.2082	-.0697	-.1175
9.4	-.273	-.2168	-.0728	-.1210
9.6	-.265	-.2253	-.0759	-.1243
9.8	-.259	-.2335	-.0788	-.1275
10.0	-.253	-.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

α_3 = 1.30

α_4	LAM 1	LAM 2	LAM 3	LAM 4
4.6	-1.156	.1244	.0000+	.1679
4.8	-1.084	.1129	.3174+	.1435
5.0	-.975	.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	-.644	.0286+	.6619$	.0239+
6.1	-.617	.0446+	.0100+	.0375+*
6.2	-.616	-.0526+	-.0118+	-.0442+
6.3	-.585	-.0104	-.2450+	-.8504+
6.4	-.572	-.0182	-.4399+	-.0146
6.6	-.535	-.0333	-.8469+	-.0258
6.8	-.510	-.0484	-.0127	-.0360
7.0	-.485	-.0622	-.0170	-.0453
7.2	-.463	-.0758	-.0213	-.0538
7.4	-.442	-.0890	-.0256	-.0618
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	-.296	-.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

α_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	.9787+	.1268
5.4	-1.001	.0855	.8546+	.0991
5.6	-.916	.0697	.6296+	.0754
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	.6822+	.1292+	.5887+
6.5	-.666	-.1226+	-.0284+	-.1052+
6.6	-.643	-.0266+	-.1702+	-.6968+
6.8	-.607	-.0230	-.5060+	-.0187
7.0	-.575	-.0373	-.8610+	-.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	-.446	-.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	-.0879	-.1453
12.2	-.265	-.2794	-.0900	-.1474

The parameter values given in this table are for a variate with zero mean and unit variance. The procedure for adjusting the parameters to reflect a different mean or variance is given in Section 3. A plus sign (+) next to a tabled value indicates that the value has two leading zeroes and should be multiplied by 10^{-2}. Similarly, a dollar sign ($) next to a tabled value indicates that the value should be multiplied by 10^{-4}. An asterisk (*) next to a tabled value of λ_i indicates that the difference between the calculated and specified values of α_j, i.e. $|\alpha_j(\lambda_3, \lambda_4) - \alpha_j|$, is somewhat greater than 0.01. See Section 4 for a discussion of the construction and accuracy of this table.

ตารางที่1 (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	.3805+	.0313
6.6	-.688	.0566+	.0104+*	.0494+*
6.7	-.747	.9962+	.1538+	.9059+
6.8	-.714	-.0290+	-.4897$	-.0256+
6.9	-.704	-.4446+	-.0768+	-.3882+
7.0	-.684	-.0115	-.2088+	-.9875+
7.2	-.647	-.0254	-.4989+	-.0218
7.4	-.615	-.0390	-.8156+	-.0312
7.6	-.585	-.0520	-.0115	-.0404
7.8	-.558	-.0648	-.0150	-.0489
8.0	-.536	-.0767	-.0184	-.0565
8.2	-.514	-.0891	-.0221	-.0648
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
12.6	-.289	-.2726	-.0851	-.1466

$\alpha_3 = 1.60$

α_4	LAM 1	LAM 2	LAM 3	LAM 4
6.0	-1.086	.0757	.0000*	.0896
6.2	-1.078	.0698	.0000	.0814
6.4	-1.011	.0573	.1699+	.0634
6.6	-.931	.0430	.2684+	.0449
6.8	-.875	.0287	.2597+	.0285
7.0	-.746	.0422+	.63568*	.0378+*
7.1	-.796	.77738+	.0969+	.7177+
7.2	-.771	-.0381+	-.4634$	-.0309+
7.3	-.751	-.5924+	-.0858+	-.5279+
7.4	-.731	-.0127	-.1942+	-.0111
7.6	-.693	-.0258	-.4383+	-.0218
7.8	-.659	-.0386	-.7111+	-.0316
8.0	-.634	-.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	.1513+	.0280
7.4	-.870	.0142	.1142+	.0138
7.5	-.852	.7546+	.0696+	.7179+
7.6	-.825	-.0250+	-.2601$	-.0232+*
7.7	-.808	-.5469+	-.0619+	-.5000+
7.8	-.784	-.0119	-.1463+	-.0107
8.0	-.745	-.0245	-.3423+	-.0212
8.2	-.709	-.0367	-.5705+	-.0308
8.4	-.678	-.0487	-.8225+	-.0397
8.6	-.650	-.0603	-.0109	-.0478
8.8	-.622	-.0717	-.0138	-.0553*
9.0	-.598	-.0827	-.0167	-.0623
9.2	-.578	-.0933	-.0196	-.0688
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	-.489	-.1420	-.0346	-.0953
10.4	-.476	-.1509	-.0375	-.0997
10.6	-.463	-.1594	-.0403	-.1630
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	-1.045	.0417	.0000*	.0456
7.4	-1.039	.0367	.0000*	.0396
7.6	-1.007	.0284	.0378+	.0298
7.8	-.945	.0155	.0646+	.0155
7.9	-.918	.9177+	.0498+	.9006+
8.0	-.892	.2914+	.0193+	.2881+
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	-.0448	-.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	-.0970	-.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	-.436	-.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	.6447+	.0150+	.6431+
8.5	-.946	.1239+	.4120$	.1215+
8.6	-.917	-.5444+	-.0257+	-.5220+
8.7	-.892	-.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	-.578	-.1269	-.0251	-.0902
11.2	-.562	-.1355	-.0277	-.0947
11.4	-.547	-.1437	-.0302	-.0989
11.6	-.533	-.1515	-.0327	-.1028
11.8	-.520	-.1594	-.0352	-.1068
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	-1.009	.0397+	.0000*	.0541+
8.8	-1.004	.0147+	.0000*	.0182+
8.9	-1.002	.2061+	.00018*	.2070+
9.0	-.993	-.1081+	-.0407$	-.1076+
9.1	-.974	-.5675+	-.7075$	-.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	-.0554	-.1373
14.8	-.436	-.2321	-.0571	-.1393
15.0	-.428	-.2380	-.0592	-.1415
15.2	-.422	-.2432	-.0610	-.1435*
15.4	-.415	-.2481	-.0628	-.1453*
15.6	-.409	-.2532	-.0646	-.1472
15.8	-.403	-.2580	-.0663	-.1489*

The parameter values given in this table are for a variate with zero mean and unit variance. The procedure for adjusting the parameters to reflect a different mean or variance is given in Section 3. A plus sign (+) next to a tabled value indicates that the value has two leading zeroes and should be multiplied by 10^{-2}. Similarly, a dollar sign ($) next to a tabled value indicates that the value should be multiplied by 10^{-4}. An asterisk (*) next to a tabled value of λ_i indicates that the difference between the calculated and specified values of α_3, i.e. $|\alpha_3(\lambda_3,\lambda_4) - \alpha_3|$, is somewhat greater than 0.01. See Section 4 for a discussion of the construction and accuracy of this table.

ตารางที่2

Coefficients for the Shapiro-Wilk Test[a]

i \ n	2	3	4	5	6	7	8	9	10
1	0.7071	0.7071	0.6872	0.6646	0.6431	0.6233	0.6052	0.0588	0.5739
2	—	0.0000	0.1667	0.2413	0.2806	0.3031	0.3164	0.3244	0.3291
3	—	—	—	0.0000	0.0875	0.1401	0.1743	0.1976	0.2141
4	—	—	—	—	—	0.0000	0.0561	0.0947	0.1224
5	—	—	—	—	—	—	—	0.0000	0.0399

i \ n	11	12	13	14	15	16	17	18	19	20
1	0.5601	0.5475	0.5359	0.5251	0.5150	0.5056	0.4968	0.4886	0.4808	0.4734
2	0.3315	0.3325	0.3325	0.3318	0.3306	0.3290	0.3273	0.3253	0.3232	0.3211
3	0.2260	0.2347	0.2412	0.2460	0.2495	0.2521	0.2540	0.2553	0.2561	0.2565
4	0.1429	0.1586	0.1707	0.1802	0.1878	0.1939	0.1988	0.2027	0.2059	0.2085
5	0.0695	0.0922	0.1099	0.1240	0.1353	0.1447	0.1524	0.1587	0.1641	0.1686
6	0.0000	0.0303	0.0539	0.0727	0.0880	0.1005	0.1109	0.1197	0.1271	0.1334
7	—	—	0.0000	0.0240	0.0433	0.0593	0.0725	0.0837	0.0932	0.1013
8	—	—	—	—	0.0000	0.0196	0.0359	0.0496	0.0612	0.0711
9	—	—	—	—	—	—	0.0000	0.0163	0.0303	0.0422
10	—	—	—	—	—	—	—	—	0.0000	0.0140

i \ n	21	22	23	24	25	26	27	28	29	30
1	0.4643	0.4590	0.4542	0.4493	0.4450	0.4407	0.4366	0.4328	0.4291	0.4254
2	0.3185	0.3156	0.3126	0.3098	0.3069	0.3043	0.3018	0.2992	0.2968	0.2944
3	0.2578	0.2571	0.2563	0.2554	0.2543	0.2533	0.2522	0.2510	0.2499	0.2487
4	0.2119	0.2131	0.2139	0.2145	0.2148	0.2151	0.2152	0.2151	0.2150	0.2148
5	0.1736	0.1764	0.1787	0.1807	0.1822	0.1836	0.1848	0.1857	0.1864	0.1870
6	0.1399	0.1443	0.1480	0.1512	0.1539	0.1563	0.1584	0.1601	0.1616	0.1630
7	0.1092	0.1150	0.1201	0.1245	0.1283	0.1316	0.1346	0.1372	0.1395	0.1415
8	0.0804	0.0878	0.0941	0.0997	0.1046	0.1089	0.1128	0.1162	0.1192	0.1219
9	0.0530	0.0618	0.0696	0.0764	0.0823	0.0876	0.0923	0.0965	0.1002	0.1036
10	0.0263	0.0368	0.0459	0.0539	0.0610	0.0672	0.0728	0.0778	0.0822	0.0862
11	0.0000	0.0122	0.0228	0.0321	0.0403	0.0476	0.0540	0.0598	0.0650	0.0697
12	—	—	0.0000	0.0107	0.0200	0.0284	0.0358	0.0424	0.0483	0.0537
13	—	—	—	—	0.0000	0.0094	0.0178	0.0253	0.0320	0.0381
14	—	—	—	—	—	—	0.0000	0.0084	0.0159	0.0227
15	—	—	—	—	—	—	—	—	0.0000	0.0076

ตารางที่2 (ต่อ)

i \ n	31	32	33	34	35	36	37	38	39	40
1	0.4220	0.4188	0.4156	0.4127	0.4096	0.4068	0.4040	0.4015	0.3989	0.3964
2	0.2921	0.2898	0.2876	0.2854	0.2834	0.2813	0.2794	0.2774	0.2755	0.2737
3	0.2475	0.2462	0.2451	0.2439	0.2427	0.2415	0.2403	0.2391	0.2380	0.2368
4	0.2145	0.2141	0.2137	0.2132	0.2127	0.2121	0.2116	0.2110	0.2104	0.2098
5	0.1874	0.1878	0.1880	0.1882	0.1883	0.1883	0.1883	0.1881	0.1880	0.1878
6	0.1641	0.1651	0.1660	0.1667	0.1673	0.1678	0.1683	0.1686	0.1689	0.1691
7	0.1433	0.1449	0.1463	0.1475	0.1487	0.1496	0.1505	0.1513	0.1520	0.1526
8	0.1243	0.1265	0.1284	0.1301	0.1317	0.1331	0.1344	0.1356	0.1366	0.1376
9	0.1066	0.1093	0.1118	0.1140	0.1160	0.1179	0.1196	0.1211	0.1225	0.1237
10	0.0899	0.0931	0.0961	0.0988	0.1013	0.1036	0.1056	0.1075	0.1092	0.1108
11	0.0739	0.0777	0.0812	0.0844	0.0873	0.0900	0.0924	0.0947	0.0967	0.0986
12	0.0585	0.0629	0.0669	0.0706	0.0739	0.0770	0.0798	0.0824	0.0848	0.0870
13	0.0435	0.0485	0.0530	0.0572	0.0610	0.0645	0.0677	0.0706	0.0733	0.0759
14	0.0289	0.0344	0.0395	0.0441	0.0484	0.0523	0.0559	0.0592	0.0622	0.0651
15	0.0144	0.0206	0.0262	0.0314	0.0361	0.0404	0.0444	0.0481	0.0515	0.0546
16	0.0000	0.0068	0.0131	0.0187	0.0239	0.0287	0.0331	0.0372	0.0409	0.0444
17	—	—	0.0000	0.0062	0.0119	0.0172	0.0220	0.0264	0.0305	0.0343
18	—	—	—	—	0.0000	0.0057	0.0110	0.0158	0.0203	0.0244
19	—	—	—	—	—	—	0.0000	0.0053	0.0101	0.0146
20	—	—	—	—	—	—	—	—	0.0000	0.0049

i \ n	41	42	43	44	45	46	47	48	49	50
1	0.3940	0.3917	0.3894	0.3872	0.3850	0.3830	0.3808	0.3789	0.3770	0.3751
2	0.2719	0.2701	0.2684	0.2667	0.2651	0.2635	0.2620	0.2604	0.2589	0.2574
3	0.2357	0.2345	0.2334	0.2323	0.2313	0.2302	0.2291	0.2281	0.2271	0.2260
4	0.2091	0.2085	0.2078	0.2072	0.2065	0.2058	0.2052	0.2045	0.2038	0.2032
5	0.1876	0.1874	0.1871	0.1868	0.1865	0.1862	0.1859	0.1855	0.1851	0.1847
6	0.1693	0.1694	0.1695	0.1695	0.1695	0.1695	0.1695	0.1693	0.1692	0.1691
7	0.1531	0.1535	0.1539	0.1542	0.1545	0.1548	0.1550	0.1551	0.1553	0.1554
8	0.1384	0.1392	0.1398	0.1405	0.1410	0.1415	0.1420	0.1423	0.1427	0.1430
9	0.1249	0.1259	0.1269	0.1278	0.1286	0.1293	0.1300	0.1306	0.1312	0.1317
10	0.1123	0.1136	0.1149	0.1160	0.1170	0.1180	0.1189	0.1197	0.1205	0.1212
11	0.1004	0.1020	0.1035	0.1049	0.1062	0.1073	0.1085	0.1095	0.1105	0.1113
12	0.0891	0.0909	0.0927	0.0943	0.0959	0.0972	0.0986	0.0998	0.1010	0.1020
13	0.0782	0.0804	0.0824	0.0842	0.0860	0.0876	0.0892	0.0906	0.0919	0.0932
14	0.0677	0.0701	0.0724	0.0745	0.0765	0.0783	0.0801	0.0817	0.0832	0.0846
15	0.0575	0.0602	0.0628	0.0651	0.0673	0.0694	0.0713	0.0731	0.0748	0.0764
16	0.0476	0.0506	0.0534	0.0560	0.0584	0.0607	0.0628	0.0648	0.0667	0.0685
17	0.0379	0.0411	0.0442	0.0471	0.0497	0.0522	0.0546	0.0568	0.0588	0.0608
18	0.0283	0.0318	0.0352	0.0383	0.0412	0.0439	0.0465	0.0489	0.0511	0.0532
19	0.0188	0.0227	0.0263	0.0296	0.0328	0.0357	0.0385	0.0411	0.0436	0.0459
20	0.0094	0.0136	0.0175	0.0211	0.0245	0.0277	0.0307	0.0335	0.0361	0.0386
21	0.0000	0.0045	0.0087	0.0126	0.0163	0.0197	0.0229	0.0259	0.0288	0.0314
22	—	—	0.0000	0.0042	0.0081	0.0118	0.0153	0.0185	0.0215	0.0244
23	—	—	—	—	0.0000	0.0039	0.0076	0.0111	0.0143	0.0174
24	—	—	—	—	—	—	0.0000	0.0037	0.0071	0.0104
25	—	—	—	—	—	—	—	—	0.0000	0.0035

SOURCE. Reprinted from Vol. 2 of Pearson and Hartley (1976), with permission from the *Biometrika* Trustees.

* The entries in this table are the coefficients a_i for use in the Shapiro-Wilk test statistic for normality given by Equation 6.2.9.

ตารางที่3

Quantiles of the Shapiro-Wilk Test Statistic[a]

n	0.01	0.02	0.05	0.10	0.50	0.90	0.95	0.98	0.99
3	0.753	0.756	0.767	0.789	0.959	0.998	0.999	1.000	1.000
4	0.687	0.707	0.748	0.792	0.935	0.987	0.992	0.996	0.997
5	0.686	0.715	0.762	0.806	0.927	0.979	0.986	0.991	0.993
6	0.713	0.743	0.788	0.826	0.927	0.974	0.981	0.986	0.989
7	0.730	0.760	0.803	0.838	0.928	0.972	0.979	0.985	0.988
8	0.749	0.778	0.818	0.851	0.932	0.972	0.978	0.984	0.987
9	0.764	0.791	0.829	0.859	0.935	0.972	0.978	0.984	0.986
10	0.781	0.806	0.842	0.869	0.938	0.972	0.978	0.983	0.986
11	0.792	0.817	0.850	0.876	0.940	0.973	0.979	0.984	0.986
12	0.805	0.828	0.859	0.883	0.943	0.973	0.979	0.984	0.986
13	0.814	0.837	0.866	0.889	0.945	0.974	0.979	0.984	0.986
14	0.825	0.846	0.874	0.895	0.947	0.975	0.980	0.984	0.986
15	0.835	0.855	0.881	0.901	0.950	0.975	0.980	0.984	0.987
16	0.844	0.863	0.887	0.906	0.952	0.976	0.981	0.985	0.987
17	0.851	0.869	0.892	0.910	0.954	0.977	0.981	0.985	0.987
18	0.858	0.874	0.897	0.914	0.956	0.978	0.982	0.986	0.988
19	0.863	0.879	0.901	0.917	0.957	0.978	0.982	0.986	0.988
20	0.868	0.884	0.905	0.920	0.959	0.979	0.983	0.986	0.988
21	0.873	0.888	0.908	0.923	0.960	0.980	0.983	0.987	0.989
22	0.878	0.892	0.911	0.926	0.961	0.980	0.984	0.987	0.989
23	0.881	0.895	0.914	0.928	0.962	0.981	0.984	0.987	0.989
24	0.884	0.898	0.916	0.930	0.963	0.981	0.984	0.987	0.989
25	0.888	0.901	0.918	0.931	0.964	0.981	0.985	0.988	0.989
26	0.891	0.904	0.920	0.933	0.965	0.982	0.985	0.988	0.989
27	0.894	0.906	0.923	0.935	0.965	0.982	0.985	0.988	0.990
28	0.896	0.908	0.924	0.936	0.966	0.982	0.985	0.988	0.990
29	0.898	0.910	0.926	0.937	0.966	0.982	0.985	0.988	0.990
30	0.900	0.912	0.927	0.939	0.967	0.983	0.985	0.988	0.990
31	0.902	0.914	0.929	0.940	0.967	0.983	0.986	0.988	0.990
32	0.904	0.915	0.930	0.941	0.968	0.983	0.986	0.988	0.990
33	0.906	0.917	0.931	0.942	0.968	0.983	0.986	0.989	0.990
34	0.908	0.919	0.933	0.943	0.969	0.983	0.986	0.989	0.990
35	0.910	0.920	0.934	0.944	0.969	0.984	0.986	0.989	0.990
36	0.912	0.922	0.935	0.945	0.970	0.984	0.986	0.989	0.990
37	0.914	0.924	0.936	0.946	0.970	0.984	0.987	0.989	0.990
38	0.916	0.925	0.938	0.947	0.971	0.984	0.987	0.989	0.990
39	0.917	0.927	0.939	0.948	0.971	0.984	0.987	0.989	0.991
40	0.919	0.928	0.940	0.949	0.972	0.985	0.987	0.989	0.991
41	0.920	0.929	0.941	0.950	0.972	0.985	0.987	0.989	0.991
42	0.922	0.930	0.942	0.951	0.972	0.985	0.987	0.989	0.991
43	0.923	0.932	0.943	0.951	0.973	0.985	0.987	0.990	0.991
44	0.924	0.933	0.944	0.952	0.973	0.985	0.987	0.990	0.991
45	0.926	0.934	0.945	0.953	0.973	0.985	0.988	0.990	0.991
46	0.927	0.935	0.945	0.953	0.974	0.985	0.988	0.990	0.991
47	0.928	0.936	0.946	0.954	0.974	0.985	0.988	0.990	0.991
48	0.929	0.937	0.947	0.954	0.974	0.985	0.988	0.990	0.991
49	0.929	0.937	0.947	0.955	0.974	0.985	0.988	0.990	0.991
50	0.930	0.938	0.947	0.955	0.974	0.985	0.988	0.990	0.991

SOURCE. Reprinted from Pearson and Hartley (1976), with permission from the *Biometrika* Trustees.

[a] The entries in this table are quantiles w_p of the Shapiro-Wilk test statistic given by Equation 6.2.9. Reject H_0 at the level p if $T_3 < w_p$.

ประวัติผู้เขียนวิทยานิพนธ์

นางสาวจงจิต มารุ่งสิริกุล เกิดวันที่ 24 ตุลาคม พ.ศ.2523 จังหวัดกรุงเทพมหานคร สำเร็จการศึกษาปริญญาตรีสถิติศาสตรบัณฑิต สาขาสถิติประยุกต์ คณะพาณิชยศาสตร์และการบัญชี จุฬาลงกรณ์มหาวิทยาลัย ในปีการศึกษา 2545 และเข้าศึกษาต่อในหลักสูตรสถิติศาสตรมหาบัณฑิต จุฬาลงกรณ์มหาวิทยาลัย ในปีการศึกษา 2546