

A P P E N D I X - I (A)

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PROGRAM ESTIMA
DIMENSION T1(1000)
COMMON ISIZE
DOUBLE PRECISION AO,BO,AON,BON,AOS,BOS,TBAR,S2T,SAO,SBO,T1,
*SUMAO,SUMBO,SUMAON,SUMBON,SUMAOS,SUMBOS,S1,S11,ZA,Q,TO,TO1
OPEN(G,FILE='PRN')
SUMAO=0
SUMBO=0
SUMAON=0
SUMBON=0
SUMAOS=0
SUMBOS=0
IX=10
IY=86
IZ=122
ISIZE=200
G=ISIZE
WRITE(G,905)
905 FORMAT(10X,'ESTIMATION OF ETA    & XZI    BY N-R METHOD' )
DO 45 J=1,100
AO=1
BO=1
S11=0
S1=0
DO 50 I=1,ISIZE
10  CALL  RANDOM(IX,IY,IZ,RAND)
U1=RAND
IF(U1.LE.0.0) GO TO 10
TO=-ALOG(U1)/AO
20  CALL RANDOM(IX,IY,IZ,RAND)
U2=RAND
IF(U2.LE.0.0) GO TO 20
TO1=-ALOG(U2)/BO
T1(I)=TO+TO1
S1=S1+T1(I)
S11=S11+T1(I)*T1(I)
50  CONTINUE
G=ISIZE
TBAR=S1/G
S2T=S11/(G-1.0)-G*TBAR*TBAR/(G-1.0)
ZA=SQRT(ABS(2.0*S2T-TBAR*TBAR))
IF(TBAR.GT.ZA) THEN
SAO=2.0/(TBAR+ZA)
SBO=2.0/(TBAR-ZA)
ENDIF
IF (TBAR.LT.ZA) THEN

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SAO=2. 0/(TBAR+ZA)
SBO=2. 0/TBAR
ENDIF
SUMAO=SUMAO+SAO
SUMBO=SUMBO+SBO
AON=SAO
BON=SBO
AOS=SAO
BOS=SBO
CALL NEWTON ( AON,BON,G,T1 )
CALL SCORE(AOS,BOS,G,T1)
SUMAON=SUMAON+AON
SUMBON=SUMBON+BON
SUMAOS=SUMAOS+AOS
SUMBOS=SUMBOS+BOS
45 CONTINUE
WRITE(G,904)SUMAO/100. 0,SUMBO/100. 0,SUMAON/100. 0,
*SUMBON/100. 0,SUMAOS/100. 0,SUMBOS/100. 0
904 FORMAT(5X,'ESTIMATED VALUE OF ALPHA BY MOMENT=' ,D15. 7,/,
*5X,'ESTIMATED VALUE OF BETA BY MOMENT=' ,D15. 7,/,5X,
*'ESTIMATED VALUE OF ALPHA BY NEWTON=' ,D15. 7,/,5X,
*'ESTIMATED VALUE OF BETA BY NEWTON=' ,D15. 7,/,5X,
*'ESTIMATED VALUE OF ALPHA BY SCORE=' ,D15. 7,/, 5X,
*'ESTIMATED VALUE OF BETA BY SCORE =' ,D15. 7)
STOP
END

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SUBROUTINE FSUM(AOJ,BOJ,T1,FSUMA,FSUMB,DSUM)
COMMON ISIZE
DIMENSION T1(ISIZE)
DOUBLE PRECISION A1,B1,SNRA,SNRB,SDRA,SDRB,C,D,T1,AOJ,BOJ
*,FSUMA1,FSUMB1,DSUM1,FSUMA,FSUMB,DSUM,G
FSUMA1=0
FSUMB1=0
DSUM1=0
DO 55 I=1,ISIZE
A1=DEXP(-AOJ*T1(I))
B1=DEXP(-BOJ*T1(I))
SNRA=T1(I)*A1
SNRB=T1(I)*B1
SDRA=A1-B1
C=T1(I)*T1(I)*A1*B1
D=(A1-B1)**2
FSUMA1=FSUMA1+SNRA/SDRA
FSUMB1=FSUMB1+SNRB/SDRA
DSUM1=DSUM1+C/D

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SUBROUTINE SCORE(AOL,BOL,G,T1)
DIMENSION T1(1000)
DOUBLE PRECISION ADER,BDER,ANEW,BNEW,DELAS,DELBS
*,ANR,ADR,BNR,BDR,AOL,BOL,G,T1,PHEE,FSUMAS,FSUMBS,DSUMS
31 PHEE=2. 0/(BOL-AOL)**4*1. 20257
CALL FSUM(AOL,BOL,T1,FSUMAS,FSUMBS,DSUMS)
ANR=G*BOL/(AOL*(BOL-AOL))-FSUMAS
ADR=-G*(BOL*(BOL-2. 0*AOL))/(AOL*AOL*(BOL-AOL)**2)-G*AOL*
* BOL*PHEE
DELAS=ANR/ADR
ANEW=AOL-DELAS
AOL=ANEW
CALL FSUM(AOL,BOL,T1,FSUMAS,FSUMBS,DSUMS)
PHEE=2. 0/(BOL-AOL)**4*1. 20257
BNR=-G*AOL/(BOL*(BOL-AOL))+FSUMBS
BDR=-G*AOL*(AOL-2. 0*BOL)/(BOL*BOL*(BOL-AOL)**2)-G*
*AOL*BOL*PHEE
DELBS=BNR /BDR
BNEW=BOL-DELBS
BOL=BNEW
10 IF((ABS(BNEW-BOL). LT. 1. E-7). AND. (ABS(ANEW-AOL). LT. 1. E-7))
GO TO 11
GO TO 31
11 RETURN
END

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