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fc2.f

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program fc
implicit double precision(a-h,o-z)
cccccccccccccccccccccccccccccccccccccccccccccccccccccccccccc
c
c                               f c
c
c program reads data from two files and produce sum
c or difference and writes statistics. the program may
c also add bias to data, or merge two data files.
c
c input: inputfile1,
c        inputfile2 (evt. dummy name),
c        outputfile (or '0'),
c        kind, ndata, hist.spacing.
c
c where kind:  0: just statistics for ifile1
c             1: difference ifile1 minus ifile2
c             2: sum
c             3: add biases to ifile1 (one for each data)
c             4: merge file1 and file2 (both with 'ndata' points)
c             5: subtract file1-file2 only when 2nd field in file1
c                less than 'trsh' (input), otherwise reject
c
c            10,11,... as 0,1,.. but with long data lines in file 1,
c            additional input: total number of data and wanted
c            data positions (file 2 standard format)
c            -1: differences between successive points in ifile1,
c            profile statistics for both raw differences and ppm,
c            useful for gps traverses.
c
c ndata is the number of data following id,lat,lon,elev
c hist.spacing is histogram spacing, if 0 no histogram is output.
c if outputfile = '0' no output is written (saves disc space!)
c
c programmer: rene forsberg, jan 85
c last updated: jul 93, rf
c
cccccccccccccccccccccccccccccccccccccccccccccccccccccccccccc
dimension r(3,9), rold(9)
logical lcol,ldif,lfile2,lofile,lbias,lmerge,lutm,lgeo,ltrsh
dimension data(18),bias(9)
dimension idata(9)
dimension sum(3,9),sum2(3,9),rmin(3,9),rmax(3,9)
dimension ihist(21,3,9)
character ifile1*72,ifile2*72,ofile*72
c
write(*,1)
1 format(' *****',
./, ' * FC - GRAVSOF file comparison - (c) RF/KMS *',
./, ' *****',
./' input file names (ifile1/ifile2/ofile): ')
read(*,2) ifile1
read(*,2) ifile2
read(*,2) ofile
2 format(a72)
write(*,2)ifile1
write(*,2)ifile2
write(*,2)ofile
write(*,12)
12 format(' input kind (0:stat, 1:dif, 2:sum, 3:bias, 4:mrg),',
.' ndata, hist.sp: ')
read(*,*) kind, ndata, rhist
if (kind.eq.5) then
write(*,*) 'input rejection threshold: '
read(*,*) trsh
endif
c
ldif = (kind.eq.-1)
lbias = (kind.eq.3)

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lmerge = (kind.eq.4)
ltrsh = (kind.eq.5)
nrej = 0
if (lmerge.or.lbias.or.ldif) kind = 0
lfile2 = (kind.gt.0.or.lmerge)
if (lbias) lfile2 = .false.
lofile = (kind.gt.0.or.ldif.or.lbias.or.lmerge)
if (ofile.eq.'0') lofile = .false.
c
open(20, file=ifile1, status='old')
if (lfile2) open(21, file=ifile2, status='unknown')
if (lofile) open(30, file=ofile, status='unknown')
c
n = 0
do 10 i=1,3
do 10 j=1,9
sum(i,j) = 0.0
sum2(i,j) = 0.0
rmin(i,j) = 999999.99
rmax(i,j) = -999999.99
do 10 k=1,21
ihist(k,i,j) = 0
10 continue
c
if (ndata.gt.9.or.lmerge.and.ndata.gt.4)
.stop '*** ndata too big, sorry ***'
ndatao = ndata
if (lmerge) ndatao = 2*ndata
lcol = .false.
if (kind.ge.10) then
if (ldif) stop 'not implemented'
kind = kind-10
lcol = .true.
write(*,901)
901 format(' input total number and data positions: ')
read(*,*) ndl,(idata(j),j=1,ndata)
endif
nn = 3
if (kind.eq.0.and.(.not.(ldif.or.lbias))) nn = 1
if (lmerge) nn = 2
c
if (lbias) then
write(*,902)
902 format(' input bias(es) to be added to data: ')
read(*,*) (bias(j),j=1,ndata)
endif
c
ndatal = ndata
if (ltrsh) ndatal = ndata+1
c
loop for data points
c -----
c
read(20,*,end=90) istold,rfiold,rlaold,rhold,
.(rold(i),i=1,ndatal)
if (.not.ldif) rewind(20)
lutm = (abs(rfiold).gt.100.or.abs(rlaold).gt.100)
lgeo = (.not.lutm)
if (lutm) write(*,19)
19 format(' - file1 and outputfile assumed to be utm - ')
c
loop entry
c
20 if (lfile2)
.read(21,*,end=90) ist2,rfi2,rla2,rh2,(r(2,i),i=1,ndata)
203 if (lcol) then
read(20,*,end=90) ist1,rfi1,rla1,rh1,(data(j),j=1,ndl)
do 201 j=1,ndata
kk = idata(j)

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201  r(1,j)=data(kk)
      else
      read(20,*,end=90) ist1,rfil,rlal,rhl,(r(1,i),i=1,ndata1)
      if (kind.eq.5) then
      if (r(1,ndata1).gt.trsh) then
      nrej = nrej +1
      goto 20
      endif
      endif
      if (ist1.ne.ist2.and.(.not.lbias)) then
      write(*,*)
      * '*** station',ist1,' not in file2 - skipped in file 1'
      goto 203
      endif
c
c baseline differences
c
      if (ldif) then
      if (lutm) then
      dr = sqrt((rfil-rfiold)**2 + (rlal-rlaold)**2)*1000
      else
      dr = sqrt((rfil-rfiold)**2 +
      ((rlal-rlaold)*cos(rfil/57.29578))**2) * 111.195
      endif
      if (dr.le.0) stop 'identical points on profile'
      do 212 i = 1, ndata
      r(2,i) = r(1,i)-rold(i)
      r(3,i) = abs(r(2,i))/dr*1000
      rold(i) = r(1,i)
      r(1,i) = dr
212  continue
      if (lofile) write(30,213)
      istold,ist1,dr,(r(2,i),i=1,ndata),(r(3,i),i=1,ndata)
213  format(' ',2i6,f9.1,3(6f9.2,/))
      istold = ist1
      rfiold = rfil
      rlaold = rlal
      goto 25
      endif
c
c difference/sum
c
      do 21 i=1, ndata
      if (kind.eq.1.or.kind.eq.5) then
      r(3,i) = r(1,i)-r(2,i)
      elseif (kind.eq.2) then
      r(3,i) = r(1,i)+r(2,i)
      elseif (lbias) then
      r(2,i) = bias(i)
      r(3,i) = r(1,i) + bias(i)
      elseif (lmerge) then
      r(3,i) = r(1,i)
      r(3,i+ndata) = r(2,i)
      endif
21  continue
c
c write output data
c
      if (lofile) then
      if (lgeo) then
      write(30,22) ist1,rfil,rlal,rhl,(r(3,i),i=1,ndatao)
22  format(' ',i9,2f11.5,f10.2,9f10.3)
      else
      write(30,221) ist1,rfil,rlal,rhl,(r(3,i),i=1,ndatao)
221  format(' ',i9,2f11.0,f10.2,9f10.3)
      endif
      if (ist1.ne.ist2.and.lfile2) write(*,24) ist1,ist2
24  format(' *** warning, different station numbers: ',2i7)

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      endif
c
25  n = n+1
      do 30 i= 1,nn
      do 30 j= 1,ndata
      sum(i,j) = sum(i,j) + r(i,j)
      sum2(i,j) = sum2(i,j) + r(i,j)**2
      if (r(i,j).lt.rmin(i,j)) rmin(i,j) = r(i,j)
      if (r(i,j).gt.rmax(i,j)) rmax(i,j) = r(i,j)
      if (rhist.gt.0) ii = r(i,j)/rhist+11.5
      if (ii.lt.1) ii = 1
      if (ii.gt.21) ii = 21
      ihist(ii,i,j) = ihist(ii,i,j)+1
30  continue
c
      goto 20
c
c exit of reading loop
c
c
c
90  if (kind.eq.0) write(*,91) n
91  format(' --- fc statistics ---, number of points: ',i5)
      if (ldif) write(*,911)
911  format(' successive differences: ',/
      , ' file1 = distances in km, file2 = differences, file3 = abs ppm ')
      if (kind.eq.1.or.kind.eq.5) write(*,92) n
92  format(' fc statistics, file3 = file1 - file2,',
      * ' number of points: ',i5)
      if (kind.eq.2) write(*,93) n
93  format(' fc statistics, file3 = file1 + file2,',
      * ' number of points: ',i5)
      if (kind.eq.5) write(*,*) 'number of rejected obs: ',nrej
      if (rhist.gt.0) write(*,94) rhist
94  format(' histogram spacing: ',f7.2)
      if (n.eq.0) stop 'no data in file'
c
c
      if (ldif) nn=3
      do 120 i = 1,nn
      write(*,100) i
100  format(' file ',i1,
      * ': dno mean stddev rms min max')
      do 110 j=1,ndata
      rm = sum(i,j)/n
      if (n.eq.1) rstdd = 0.0
      if (n.gt.1) rstdd = (sum2(i,j)-sum(i,j)**2/n)/(n-1)
      rstdd = sqrt(abs(rstdd))
      rms = sqrt(sum2(i,j)/n)
      write(*,104) j,rm,rstdd,rms,rmin(i,j),rmax(i,j)
104  format(' ',i3,5f8.2)
      if (rhist.gt.0) write(*,105) (ihist(k,i,j),k=1,21)
105  format(' ',21i3/,
      * ' * -9 -8 -7 -6 -5 -4 -3 -2 -1 0 1 2 3 4 5 6 7 8',
      * ' 9 *')
110  continue
120  continue
      end

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