

上方接続プログラム

入力パラメーター

dint メッシュサイズ(km)

feet 測定高度 (feet)

ipara=0 : フーリエ係数を求めるときの条件で cos-sin 展開として展開域を $0-2\pi$ とした。

mstx,msty=0,0 : 求めるフーリエ係数の最小値。

画面から上方接続高度を入力

このプログラムは 350×350 までのデータを扱う。

入力ファイル

163	152			
1	1	582.5	4649.5	-53.4857
1	2	582.5	4650	-52.3453
1	3	582.5	4650.5	-51.1048

出力ファイル

163	152			
		1	1	-60.9463
		1	2	-62.5282
		1	3	-63.8656

c

c upward continuation program

c

by RIE

c

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common /lab1/ fs(501),ms,ks,ke,a(501),mm,mc,ma,mb,ical

common /lab3/ mx,my,sx,sy,sz

common /lab4/ icos,jcos,msx,mex,msy,mey,nxa,nya,ipi,jpi,

& nx,ny

common /lab5/ dum(3),spx,spy

common /lab7/ mxd,msxd,mexd,msyd,meyd,mnd,rmn,tmn

common /lab9/ ksxd,kexd,ksyd,keyd

dimension g(122500), f(122500)

dimension d(122500)

dimension w(122500)

```

c
data dint/0.5/
data feet/1500./
c
ipara: cos=sin 0-2pai=0, -pai-pai=1, cos=2, (mx=1 or my=1)=2
data ipara/0/,mstx,msty/0,0/
c
sx=dint
sy=dint
sz=-feet*0.3048/1000
c
write(6,*) 'upward/downward continuation'
write(6,*) 'data altitude (km)',-sz
write(6,*) 'upward altitude (km):'
read(5,*) upz ←画面から入力
z=-upz-sz
c
ipi=ipara
jpi=ipara
msx=mstx
msy=msty
ksx=mstx
ksy=msty
c
open(1,file='urakawa500_res.txt') ←入力ファイル
read(1,*) mx, my
mxd=(mx/2)*2+1
myd=(my/2)*2+1
do 10 i=1, mx
do 10 j=1, my
  read(1,*) m, n, xx, yy, dat
  k=mxd*(j-1)+i
  g(k)=dat
10 continue
close(1)
c
if(ipi.eq.2 .or. jpi.eq.2) then

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        icos=1
        jcos=1
        nxa=mx-1
        nya=my-1
    else
        icos=0
        jcos=0
        nxa=mx/2
        nya=my/2
    end if
c
    mex=nxa
    mey=nya
    nx=mx
    ny=my
c
    kex=mx-1
    key=my-1
    ksxd=ksx+1
    kexd=kex+1
    ksyd=ksy+1
    keyd=key+1
c
    msxd=msx+1
    mexd=mex+1
    msyd=msy+1
    meyd=mey+1
    mnd=mxd*myd
c
    if(mx.gt.1 .and. ipi.ne.2) tx=mx
    if(mx.gt.1 .and. ipi.eq.2) tx=2*(mx-1)
    if(my.gt.1 .and. jpi.ne.2) ty=my
    if(my.gt.1 .and. jpi.eq.2) ty=2*(my-1)
    if(mx.gt.1 .and. my.eq.1) rmn=2/tx
    if(my.gt.1 .and. mx.eq.1) rmn=2/ty
    if(mx.gt.1 .and. my.gt.1) rmn=4/(tx*ty)

```


c

```
common /lab1/ fs(501),ms,ks,ke,a(501),mm,mc,ma,mb,ical
common /lab3/ mx,my,sx,sy,sz
common /lab4/ icos,jcos,msx,mex,msy,mey,nxa,nya,ipi,jpi,
&          nx,ny
common /lab7/ mxd,msxd,mexd,msyd,meyd,mnd,rmn,tmn
dimension g(122500), f(122500)
```

c

```
if(mx.le.1) go to 52
ical=0
ms=mx
mm=mx
ma=msx
mb=mex
mc=ipi
```

c

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do 43 j=1,my
  kjd=mxd*(j-1)
do 41 i=1,mx
  k=kjd+i
  fs(i)=g(k)
41 continue
  if(icos.eq.0) call ftrnsf
  if(icos.eq.1) call cftrns
do 42 m=msxd,mexd
  k=kjd+m
  f(k)=a(m)
42 continue
  if(icos.ne.0) go to 43
  kdd=kjd+nxa
do 32 m=msxd, mexd
  if(m.eq.1) go to 32
  kd=kdd+m
  md=nxa+m
  f(kd)=a(md)
32 continue
```

43 continue

c

52 continue

if(my.le.1) go to 50

ical=0

ms=my

mm=my

ma=msy

mb=mey

mc=jpi

c

do 49 m=msxd, mexd

do 45 j=1,my

k=mxd*(j-1)+m

fs(j)=f(k)

45 continue

if(jcos.eq.0) call ftrnsf

if(jcos.eq.1) call cftrns

kjd=mxd*(nya-1)+m

do 46 n=msyd, meyd

k=mxd*(n-1)+m

f(k)=a(n)

46 continue

if(jcos.ne.0) go to 37

do 36 n=msyd, meyd

if(n.eq.1) go to 36

kd=kjd+mxd*n

ld=n+nya

f(kd)=a(ld)

36 continue

37 continue

if(icos.ne.0) go to 49

if(m.eq.1) go to 49

kmd=-mxd+nxa+m

do 47 j=1, my

k=kmd+mxd*j

```

        fs(j)=f(k)
47  continue
        if(jcos.eq.0) call ftrnsf
        if(jcos.eq.1) call cftrns
do 48 n=msyd, meyd
        k=kmd+mxd*n
        f(k)=a(n)
48  continue
        if(jcos.ne.0) go to 49
        kdd=kmd+mxd*nya
do 38 n=msyd, meyd
        if(n.eq.1) go to 38
        kd=kdd+mxd*n
        ld=n+nya
        f(kd)=a(ld)
38  continue
49  continue
c
50  continue
        nx=mx
        ny=my
        return
        end
c
c
        subroutine ftrnsf
        common /lab1/ fs(501),ms,ks,ke,a(501),mm,mc,ma,mb,ical
        dimension fcos(501),fsin(501)
c
        if(ical.ne.0) go to 30
        nb=(ms-1)/2
        mbd=mb
        if(nb.lt.mbd) mbd=nb
        sms=ms
        rsm=2.0/sms
        srm=6.2831854/sms

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    mk=ms/2
do 40 k=1, ms
    sk=k-1
    skp=sk*srm
    fcos(k)=cos(skp)
    fsin(k)=sin(skp)
40 continue
    ical=1
c
30 continue
    mad=ma
    if(ma.ne.0) go to 12
    ab=0.0
do 11 i=1,ms
    ab=ab+fs(i)
11 continue
    a(1)=rsm*ab
    mad=1
12 continue
c
do 14 k=mad,mbd
    ab=0.0
    ba=0.0
do 16 j=1,ms
    ls=k*(j-1)
    kp=ls-(ls/ms)*ms+1
    ab=ab+fs(j)*fcos(kp)
    ba=ba+fs(j)*fsin(kp)
16 continue
    kd=k+1
    a(kd)=ab*rsm
    ld=kd+mk
    a(ld)=ba*rsm
14 continue
c
    if(mc.eq.0) go to 18

```



```

do 17 k=mad,mbd
  sing=(-1)**k
  kd=k+1
  ld=kd+mk
  a(kd)=a(kd)*sing
  a(ld)=a(ld)*sing
17 continue
18 continue
  if(mb.le.nb) go to 20
  if(nb.eq.mk) go to 20
  ab=0.0
do 15 j=1,ms
  nj=j-1
  ab=ab+((-1.0)**nj)*fs(j)
15 continue
  kd=mk+1
  a(kd)=rsm*ab*(-1.0)**(mc*mm)
  ld=kd+mk
  a(ld)=0.0
20 continue
  return
  end
c
c
  subroutine cftrns
  common /lab1/ fs(501),ms,ks,ke,a(501),mm,mc,ma,mb,ical
  dimension fcos(1000)
c
  if(ical.ne.0) go to 30
  na=ms-1
  sna=na
  ns=2*na
  sms=ns
  srm=6.2831854/sms
  rsm=2.0/sms
do 40 k=1, ns

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```

        sk=k-1
        skp=sk*srm
        fcos(k)=cos(skp)
40 continue
        ical=1
c
30 continue
        mad=ma
        if(ma.ne.0) go to 12
        ab=fs(1)+fs(ms)
        do 11 i=2,na
            ab=ab+2.0*fs(i)
11 continue
        a(1)=rsm*ab
        mad=1
12 continue
        mbd=mb
        if(na.eq.mb) mbd=mb-1
c
        do 15 k=mad,mbd
            ls=k*na
            kp=ls-(ls/ns)*ns+1
            ab=fs(1)+fs(ms)*fcos(kp)
            do 14 j=2,na
                ls=k*(j-1)
                kp=ls-(ls/ns)*ns+1
                ab=ab+2.0*fs(j)*fcos(kp)
14 continue
            kd=k+1
            a(kd)=ab*rsm
15 continue
c
        if(mbd.eq.mb) go to 20
        ab=fs(1)-((-1.0)**ms)*fs(ms)
        do 16 j=2,na
            ab=ab-2.0*((-1.0)**k)*fs(k)

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    knd=msxd*(n-1)
    lnd=mmd*(n-1)
do 201 m=msxd, mexd
    ka=lnd+m
    a(m)=q(ka)
201 continue
if (icos.ne.0) go to 202
    ldd=lnd+nxa
do 211 m=msxd,mexd
    if(m.eq.1) go to 211
    kb=ldd+m
    l=m+nxa
    a(l)=q(kb)
211 continue
202 continue
    a(1)=0.5*a(1)
    a(mexd)=sn*a(mexd)
    if(icos.eq.0) call rfrtrns
    if(icos.eq.1) call rcftrn
do 203 k=ksxd,kexd
    ka=knd+k
    d(ka)=fs(k)
203 continue
if(jcos.ne.0) go to 210
if(n.eq.1) go to 210
    kmd=msxd*(nya+n-1)
    lmd=mmd*(nya+n-1)
do 206 m=msxd,mexd
    ka=lmd+m
    a(m)=q(ka)
206 continue
if(icos.ne.0) go to 208
    kdd=lmd+nxa
do 209 m=msxd,mexd
    if(m.eq.1) go to 209
    kb=kdd+m

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        l=m+nxa
        a(l)=q(kb)
209  continue
208  continue
        a(1)=0.5*a(1)
        a(mexd)=sn*a(mexd)
        if(icos.eq.0) call rftrns
        if(icos.eq.1) call rcftrn
do 207 k=ksxd,kexd
        ka=kmd+k
        d(ka)=fs(k)
207  continue
210  continue
c
260  continue
        if(my.le.1) go to 500
        ical=0
        ms=my
        ma=msy
        mb=mey
        mc=jpi
        mm=ny
        ks=ksyd-1
        ke=keyd-1
        nd=ny
        if(jcos.eq.0) nd=(ny+1)/2+1
        sn=1
        if(meyd.eq.nd) sn=0.5
        lcd=mxd*nya
c
do 230 i=ksxd, kexd
do 220 n=msyd,meyd
        ka=mxd*(n-1)+i
        a(n)=d(ka)
220  continue
        if(jcos.ne.0) go to 225

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```

        ldd=lcd+i
do 223 n=msyd,meyd
    if(n.eq.1) go to 223
    kc=ldd+mx*d*(n-1)
    l=n+nya
    a(l)=d(kc)
223 continue
225 continue
    a(1)=0.5*a(1)
    a(meyd)=sn*a(meyd)
    if(jcos.eq.0) call rftrns
    if(jcos.eq.1) call rcftrn
do 221 j=ksxd,kexd
    ka=mx*d*(j-1)+i
    d(ka)=fs(j)
221 continue
230 continue
c
500 continue
    return
    end
c
c
subroutine rftrns
common /lab1/ fs(501),ms,ks,ke,a(501),mm,mc,ma,mb,ical
dimension fcos(501),fsin(501)
if(ical.eq.1) go to 50
    smm=mm
    srm=6.2831854/smm
    md=mm/2
    mad=ma+1
    mbd=mb+1
    ksd=ks+1
    ked=ke+1
do 40 k=1,mm
    sk=k-1

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```

        skp=sk*srm
        fcos(k)=cos(skp)
        fsin(k)=sin(skp)
40 continue
        ical=1
50 continue
        do 60 i=ksd, ked
            fa=0
            do 55 k=mad,mbd
                ls=(i-1)*(k-1)
                kp=ls-(ls/mm)*mm+1
                sign=(-1)**(mc*(k-1))
                fa=fa+sign*a(k)*fcos(kp)
                if(k.eq.1) go to 55
                l=k+md
                fa=fa+sign*a(l)*fsin(kp)
55 continue
            fs(i)=fa
60 continue
        return
        end
c
c
        subroutine reftrn
        common /lab1/ fs(501),ms,ks,ke,a(501),mm,mc,ma,mb,ical
        dimension fcos(1000)
        if(ical.eq.1) go to 50
            ns=2*(mm-1)
            smm=ns
            srm=6.2831854/smm
            md=mm/2
            mad=ma+1
            mbd=mb+1
            ksd=ks+1
            ked=ke+1
        do 40 k=1,mm

```



```
    smx=sm*spx
    weit=wcont(smx,sny,z)
    ka=kad+m
    kb=ka+nxa
    kc=kcd+ka
    kd=kc+nxa
    w(ka)=weit*f(ka)
    if(icos.eq.0.and.m.ne.1) w(kb)=weit*f(kb)
    if(jcos.eq.0.and.n.ne.1) w(kc)=weit*f(kc)
    if(icos.eq.0.and.m.ne.1.and.jcos.eq.0.and.n.ne.1) then
        w(kd)=weit*f(kd)
    end if
10 continue
    return
end
```