

! 3-D Numerical Wave Basin Program by BEM

! (Warning !! only for PC Cluster with 8 CPUs)

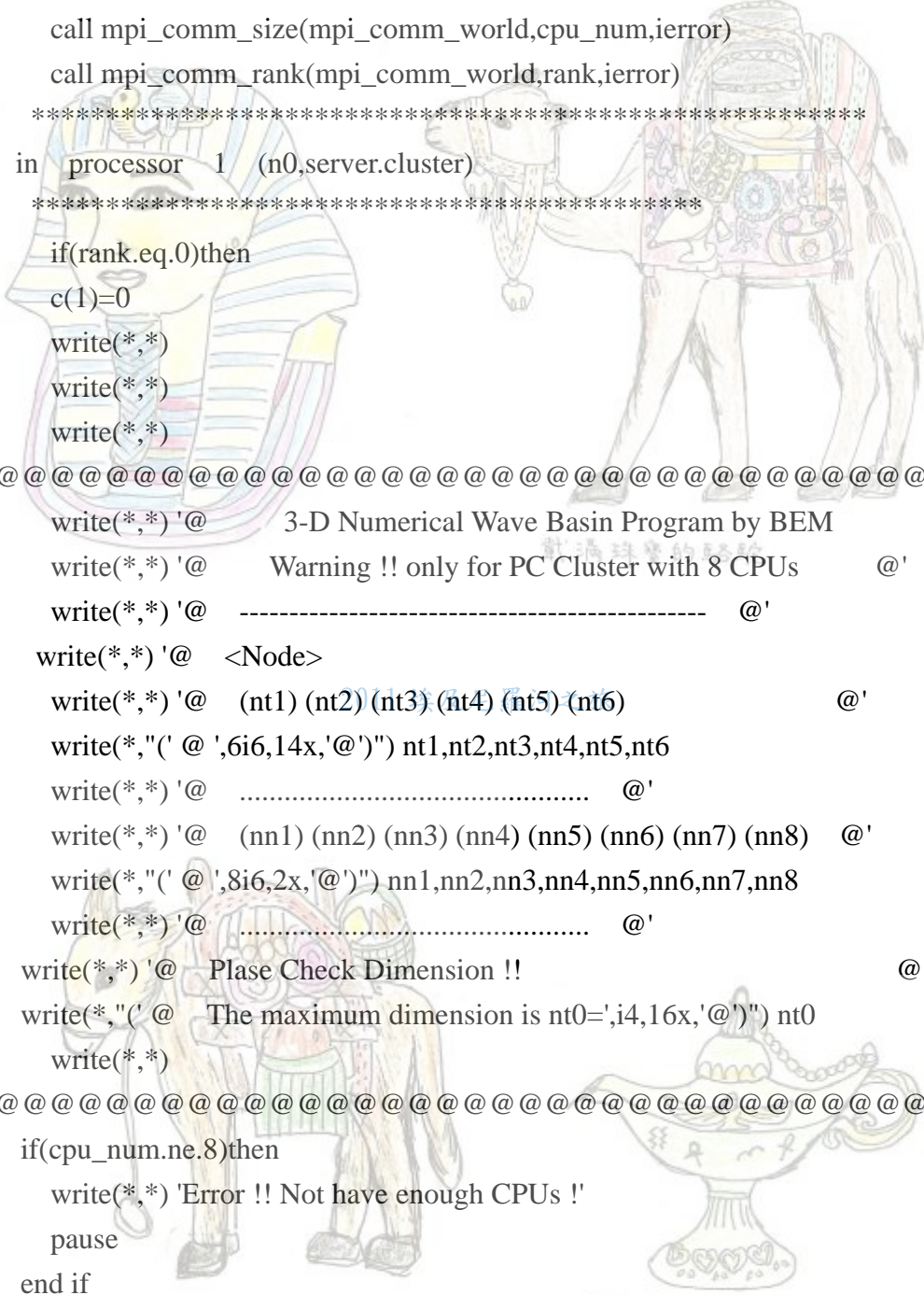
! 2005/3/22 , 13:40 , chou

!*****

```
include 'mpif.h'
integer stat(mpi_status_size),rank,cpu_num
integer c(8)
character(len=*) path
parameter(path='\\3dwave17\chou\3dwave8\20x40x0.5\')
parameter(ni1=121,nj1=41,ni2=3,nj2=41,ni3=3,nj3=61,
&          ni4=3,nj4=61,ni5=3,nj5=41,ni6=31,nj6=11,b6=1)
parameter(ni11=ni1-1,nj11=nj1-1,ni21=ni2-1,nj21=nj2-1,ni31=ni3-1,
&          nj31=nj3-1,ni41=ni4-1,nj41=nj4-1,ni51=ni5-1,nj51=nj5-1,
&          ni61=ni6-1,nj61=nj6-1)
parameter(nt1=ni1*nj1,nt2=ni2*nj2,nt3=ni3*nj3,
&          nt4=ni4*nj4,nt5=ni5*nj5,nt6=ni6*nj6,
&          nt=nt1+nt2+nt3+nt4+nt5+nt6)
parameter(nn1=nt1/6,nn2=nn1,nn3=nn1,nn4=nn1,nn5=nn1,nn6=nt1-nn1*5,
&          nn7=nt2+nt3+nt4+nt5,nn8=nt6)
parameter(ist1=1,                                jst1=ist1,
&          ist2=nn1+nn2+1,                        jst2=ist2,
&          ist3=nn1+nn2+nn3+nn4+1,              jst3=ist3,
&          ist4=nn1+nn2+nn3+nn4+nn5+nn6+1,jst4=ist4)
parameter(nspec=1024)
!+++++
!   select large one between nn1 to nn8
parameter(nt0=nn6)
!+++++
!   change case by case
parameter(i_dis=0)
!=====
real x(nt),y(nt),z(nt),fxx(nt1),fyy(nt1),fzz(nt1)
real hh(nt0,nt0),gg(nt0,nt0),xp(3,3)
real f1(nt1),f1b(nt1),f2b(nt2),xpkj(3,3,nj1)
real u(nj2),xx(4),yy(4),zz(4),tmp(nt)
real rnum(nspec),s0(nspec),hkk(nspec),re(nspec),ss(nspec),
&     e25(25),f25(25),theta(nspec)
character*8 systeme
```

real mas,eng,maso,engo,err_mas,err_eng,ek,ep

```
!=====
call mpi_init(ierror)
call mpi_comm_size(mpi_comm_world,cpu_num,ierror)
call mpi_comm_rank(mpi_comm_world,rank,ierror)
! *****
! in processor 1 (n0,server.cluster)
! *****
if(rank.eq.0)then
c(1)=0
write(*,*)
write(*,*)
write(*,*)
'@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@'
write(*,*) '@ 3-D Numerical Wave Basin Program by BEM @'
write(*,*) '@ Warning !! only for PC Cluster with 8 CPUs @'
write(*,*) '@ ----- @'
write(*,*) '@ <Node> @'
write(*,*) '@ (nt1) (nt2) (nt3) (nt4) (nt5) (nt6) @'
write(*,*) '@ (' @ ',6i6,14x,'@')" nt1,nt2,nt3,nt4,nt5,nt6
write(*,*) '@ ..... @'
write(*,*) '@ (nn1) (nn2) (nn3) (nn4) (nn5) (nn6) (nn7) (nn8) @'
write(*,*) '@ (' @ ',8i6,2x,'@')" nn1,nn2,nn3,nn4,nn5,nn6,nn7,nn8
write(*,*) '@ ..... @'
write(*,*) '@ Plase Check Dimension !! @'
write(*,*) '@ The maximum dimension is nt0='i4,16x,'@')" nt0
write(*,*)
'@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@'
if(cpu_num.ne.8)then
write(*,*) 'Error !! Not have enough CPUs !'
pause
end if
write(*,*)
!=====
open(25,file=path/'3dwave.in',form='formatted',status='old')
read(25,*) icase
read(25,*) start
read(25,*) eend
```

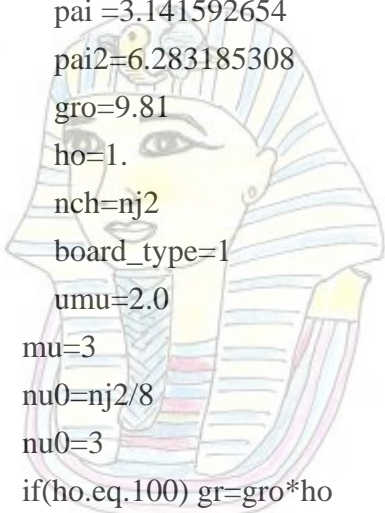


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```
read(25,*) wave
close(25)
```

=====

```
pa2i=1.570796327
pai =3.141592654
pai2=6.283185308
gro=9.81
ho=1.
nch=nj2
board_type=1
umu=2.0
mu=3
! nu0=nj2/8
nu0=3
if(ho.eq.100) gr=gro*ho
if(ho.ne.100) gr=gro
```

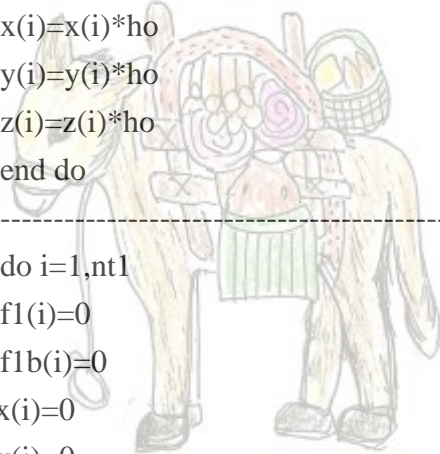


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=====

```
if(icase.eq.1) then
open(34,file=path/'xyz.dat',form='formatted',status='old')
read(34,4) (x(i),y(i),z(i),i=1,nt)
close(34)
do i=1,nt
x(i)=x(i)*ho
y(i)=y(i)*ho
z(i)=z(i)*ho
end do
```

```
do i=1,nt1
f1(i)=0
f1b(i)=0
fxx(i)=0
fyy(i)=0
fzz(i)=0
end do
do i=1,nt2
f2b(i)=0
end do
end if
```



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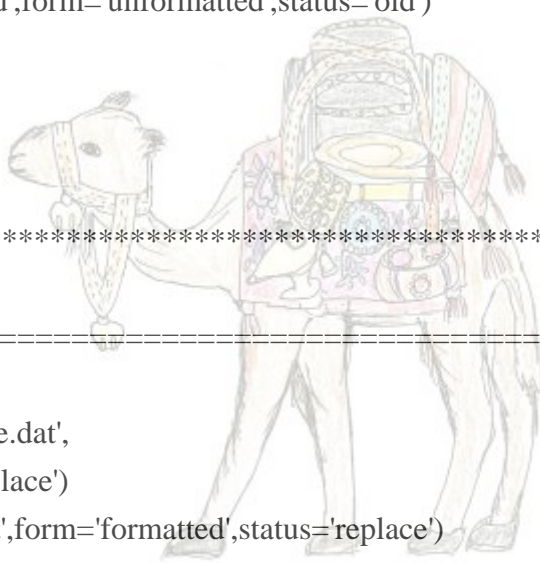
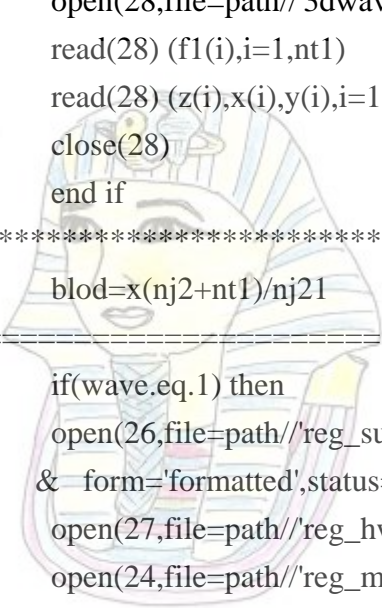


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```

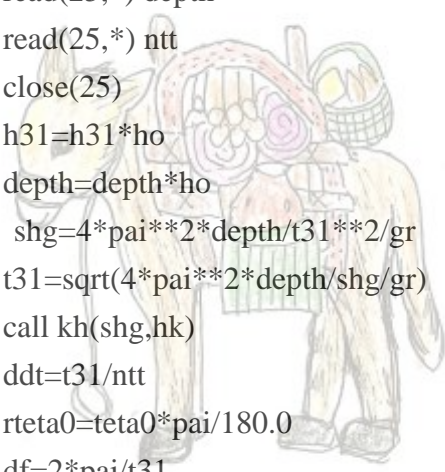
=====
      if(icase.ne.1) then
      open(28,file=path/'3dwave.old',form='unformatted',status='old')
      read(28) (f1(i),i=1,nt1)
      read(28) (z(i),x(i),y(i),i=1,nt)
      close(28)
      end if
!*****
      blod=x(nj2+nt1)/nj21
!-----
      if(wave.eq.1) then
      open(26,file=path/'reg_surface.dat',
& form='formatted',status='replace')
      open(27,file=path/'reg_hw.dat',form='formatted',status='replace')
      open(24,file=path/'reg_mass.dat',
& form='formatted',status='replace')
      open(25,file=path/'regular.dat')
!      read(25,*) t31
      read(25,*) shg
      read(25,*) h31
      read(25,*) teta0
      read(25,*) depth
      read(25,*) ntt
      close(25)
      h31=h31*ho
      depth=depth*ho
!      shg=4*pai**2*depth/t31**2/gr
      t31=sqrt(4*pai**2*depth/shg/gr)
      call kh(shg,hk)
      ddt=t31/ntt
      rteta0=teta0*pai/180.0
      df=2*pai/t31
      e=df*h31/2*(sinh(hk)*cosh(hk)+hk)/2./sinh(hk)**2
      write(27,*) 'shg=',shg,' t31=',t31,' t31=',t31,
/ ' teta0=',teta0,' kh=',hk,' l/h=',pai2/hk,' ntt=',ntt
/ ', w=',x(nj1),' l=',y(nt1)
      write(26,*) 'shg=',shg,' t31=',t31,' t31=',t31,
/ ' teta0=',teta0,' kh=',hk,' l/h=',pai2/hk,' ntt=',ntt

```



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```

/ , w=',x(nj1),' l=',y(nt1)
write(24,*) 'shg=',shg,' t31=',t31,' t31=',t31,
/ ' teta0=',teta0,' kh=',hk,' l/h=',pai2/hk,' ntt=',ntt
/ , w=',x(nj1),' l=',y(nt1)
write(*,*) 'shg=',shg,' t31=',t31,' t31=',t31,
/ ' teta0=',teta0,' kh=',hk,' l/h=',pai2/hk,' ntt=',ntt
/ , w=',x(nj1),' l=',y(nt1)
end if

```

!=====

```

if(wave.eq.2) then
open(26,
file=path/'cross_surface.dat',form='formatted',status='replace')
open(27,file=path/'cross_hw.dat',form='formatted',
& status='replace')
open(24,file=path/'cross_mass.dat',form='formatted',
& status='replace')

```

```
open(25,file=path/'cross.dat')
```

```
read(25,*) shg1
```

```
read(25,*) h31
```

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```
read(25,*) teta01
```

```
read(25,*) shg2
```

```
read(25,*) h32
```

```
read(25,*) teta02
```

```
read(25,*) depth
```

```
read(25,*) ntt
```

```
close(25)
```

```
depth=depth*ho
```

```
h31=h31*ho
```

```
t31=sqrt(4*pai**2*depth/shg1/gr)
```

```
call kh(shg1,hk1)
```

```
ddt=t31/ntt
```

```
rteta01=teta01*pai/180.0
```

```
df1=2*pai/t31
```

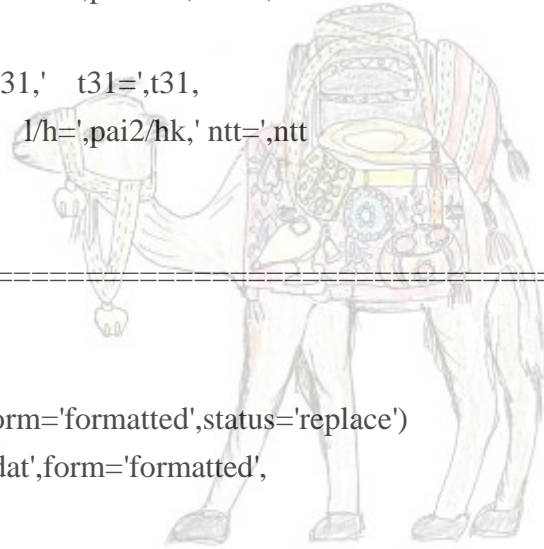
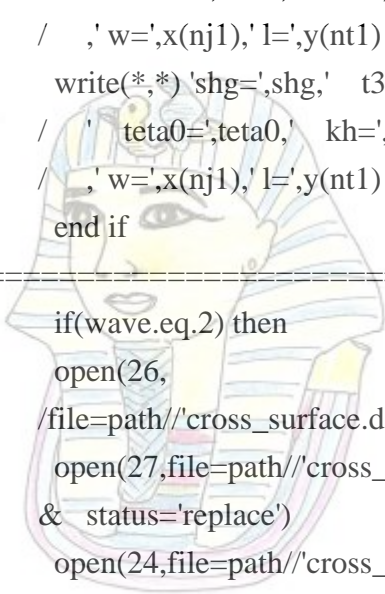
```
h32=h32*ho
```

```
t32=sqrt(4*pai**2*depth/shg2/gr)
```

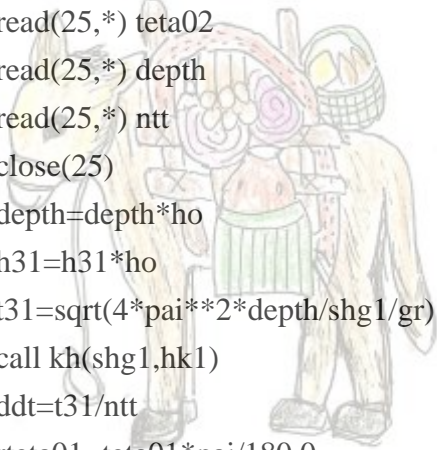
```
call kh(shg2,hk2)
```

```
rteta02=teta02*pai/180.0
```

```
df2=2*pai/t32
```



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```
e1=df1*h31/2*(sinh(hk1)*cosh(hk1)+hk1)/2./sinh(hk1)**2
```

```
e2=df2*h32/2*(sinh(hk2)*cosh(hk2)+hk2)/2./sinh(hk2)**2
```

```
write(27,*)
```

```
/'shg1=',shg1,' t31=',t31,' h31=',h31,' kh1=',hk1,
```

```
/' teta01=',teta01,' l1/h=',pai2/hk1,' ntt=',ntt
```

```
write(26,*)
```

```
/'shg1=',shg1,' t31=',t31,' h31=',h31,' kh1=',hk1,
```

```
/' teta01=',teta01,' l1/h=',pai2/hk1,' ntt=',ntt
```

```
write(24,*)
```

```
/'shg1=',shg1,' t31=',t31,' h31=',h31,' kh1=',hk1,
```

```
/' teta01=',teta01,' l1/h=',pai2/hk1,' ntt=',ntt
```

```
write(*,*)
```

```
/'shg1=',shg1,' t31=',t31,' h31=',h31,' kh1=',hk1,
```

```
/' teta01=',teta01,' l1/h=',pai2/hk1,' ntt=',ntt
```

```
write(27,*)
```

```
/'shg2=',shg2,' t32=',t32,' h32=',h32,' kh2=',hk2,
```

```
/' teta02=',teta02,' l2/h=',pai2/hk2,' ntt=',ntt
```

```
/' w=',x(nj1),' l=',y(nt1)
```

```
write(26,*)
```

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```
/'shg2=',shg2,' t32=',t32,' h32=',h32,' kh2=',hk2,
```

```
/' teta02=',teta02,' l2/h=',pai2/hk2,' ntt=',ntt
```

```
/' w=',x(nj1),' l=',y(nt1)
```

```
write(24,*)
```

```
/'shg2=',shg2,' t32=',t32,' h32=',h32,' kh2=',hk2,
```

```
/' teta02=',teta02,' l2/h=',pai2/hk2,' ntt=',ntt
```

```
/' w=',x(nj1),' l=',y(nt1)
```

```
write(*,*)
```

```
/'shg2=',shg2,' t32=',t32,' h32=',h32,' kh2=',hk2,
```

```
/' teta02=',teta02,' l2/h=',pai2/hk2,' ntt=',ntt
```

```
/' w=',x(nj1),' l=',y(nt1)
```

```
end if
```

=====

```
if(wave.eq.3) then
```

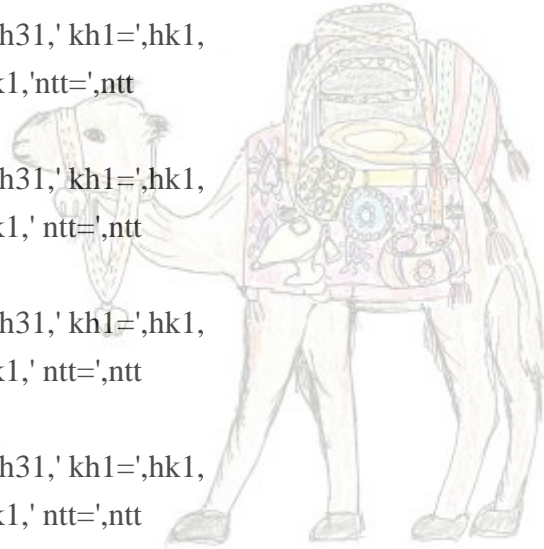
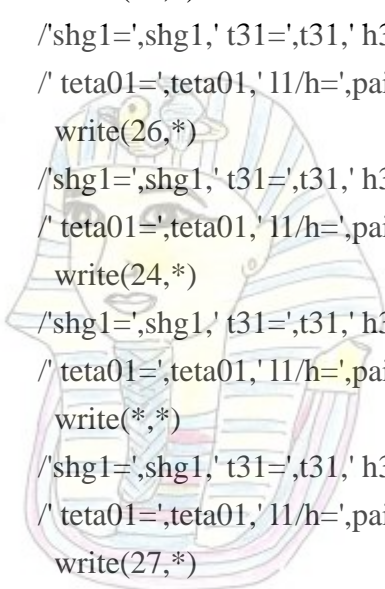
```
open(26,
```

```
/'file=path/'soliton_surface.dat',form='formatted',
```

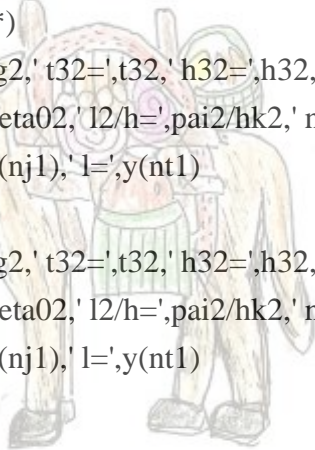
```
& status='replace')
```

```
open(27,file=path/'soliton_hw.dat',form='formatted',
```

```
& status='replace')
```



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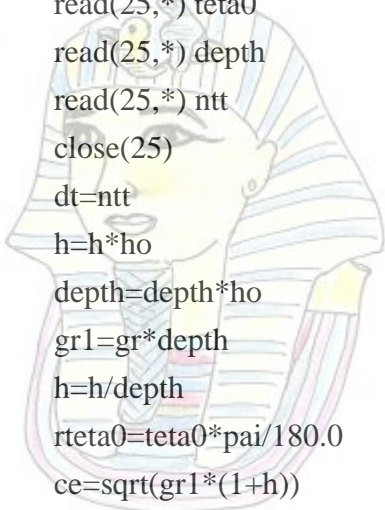


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```

open(24,file=path//'soliton_mass.dat',form='formatted',
& status='replace')
open(25,file=path//'soliton.dat')
read(25,*) h
read(25,*) teta0
read(25,*) depth
read(25,*) ntt
close(25)
dt=ntt
h=h*ho
depth=depth*ho
gr1=gr*depth
h=h/depth
rteta0=teta0*pai/180.0
ce=sqrt(gr1*(1+h))
xo=sqrt(4.*h/3./(1+h))
omega=sqrt(gr1)*sqrt(.75*h*(1+h))
tc=pai/omega
xleff=9.5766/sqrt(h)
teff=xleff/ce
ddt=tc/ntt
write(24,*) 'h=',h,' teta0=',teta0,' depth=',depth,
/ ' xleff=',xleff,' teff=',teff,' ntt=',ntt
/ ', w=',x(nj1),' l=',y(nt1),' tc=',tc
write(26,*) 'h=',h,' teta0=',teta0,' depth=',depth,
/ ' xleff=',xleff,' teff=',teff,' ntt=',ntt
/ ', w=',x(nj1),' l=',y(nt1),' tc=',tc
write(27,*) 'h=',h,' teta0=',teta0,' depth=',depth,
/ ' xleff=',xleff,' teff=',teff,' ntt=',ntt
/ ', w=',x(nj1),' l=',y(nt1),' tc=',tc
write(*,*) 'h=',h,' teta0=',teta0,' depth=',depth,
/ ' xleff=',xleff,' teff=',teff,' ntt=',ntt
/ ', w=',x(nj1),' l=',y(nt1),' tc=',tc
end if

```



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!=====

```

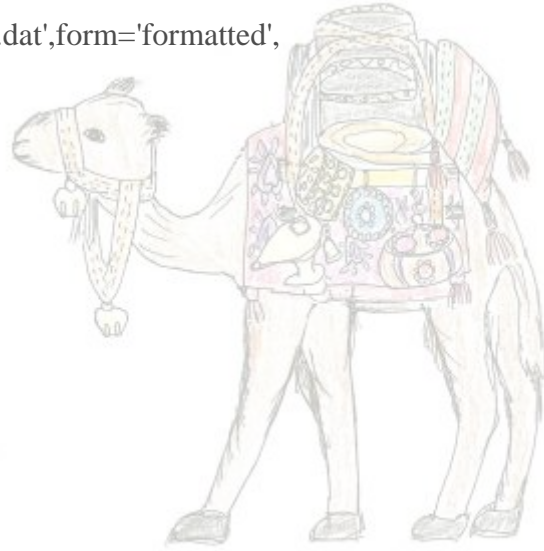
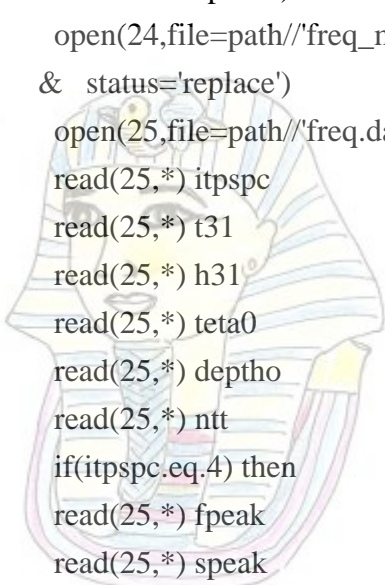
if(wave.eq.4) then
open(26,
/ file=path//'freq_surface.dat',form='formatted',

```

```

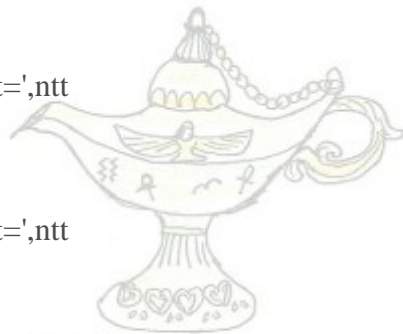
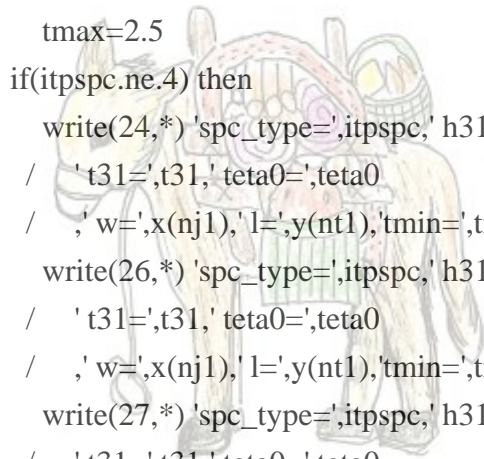
& status='replace')
open(27,file=path//'freq_hw.dat',form='formatted',
& status='replace')
open(24,file=path//'freq_mass.dat',form='formatted',
& status='replace')
open(25,file=path//'freq.dat')
read(25,*) itpspc
read(25,*) t31
read(25,*) h31
read(25,*) teta0
read(25,*) deptho
read(25,*) ntt
if(itpspc.eq.4) then
read(25,*) fpeak
read(25,*) speak
read(25,*) (e25(i),i=2,25)
end if
close(25)
dtt=ntt
h31=h31*ho
depth=deptho*ho
tmin=0.5
tmax=2.5
if(itpspc.ne.4) then
write(24,*) 'spc_type=',itpspc,' h31=',h31,
/ ' t31=',t31,' teta0=',teta0
/ ', w=',x(nj1),' l=',y(nt1),' tmin=',tmin,' ntt=',ntt
write(26,*) 'spc_type=',itpspc,' h31=',h31,
/ ' t31=',t31,' teta0=',teta0
/ ', w=',x(nj1),' l=',y(nt1),' tmin=',tmin,' ntt=',ntt
write(27,*) 'spc_type=',itpspc,' h31=',h31,
/ ' t31=',t31,' teta0=',teta0
/ ', w=',x(nj1),' l=',y(nt1),' tmin=',tmin,' ntt=',ntt
write(*,*) 'spc_type=',itpspc,' h31=',h31,
/ ' t31=',t31,' teta0=',teta0
/ ', w=',x(nj1),' l=',y(nt1),' tmin=',tmin,' ntt=',ntt
else
write(24,*) 'spc_type=',itpspc,' fpeak=',fpeak,' speak=',speak

```



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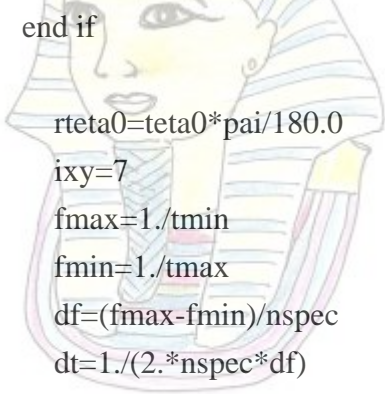


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```

/ , w=',x(nj1),' l=',y(nt1),' tmin=',tmin,' ntt=',ntt
write(26,*) 'spc_type=',itpspc,' fpeak=',fpeak,' speak=',speak
/ , w=',x(nj1),' l=',y(nt1),' tmin=',tmin,' ntt=',ntt
write(27,*) 'spc_type=',itpspc,' fpeak=',fpeak,' speak=',speak
/ , w=',x(nj1),' l=',y(nt1),' tmin=',tmin,' ntt=',ntt
write( *,*) 'spc_type=',itpspc,' fpeak=',fpeak,' speak=',speak
/ , w=',x(nj1),' l=',y(nt1),' tmin=',tmin,' ntt=',ntt
end if

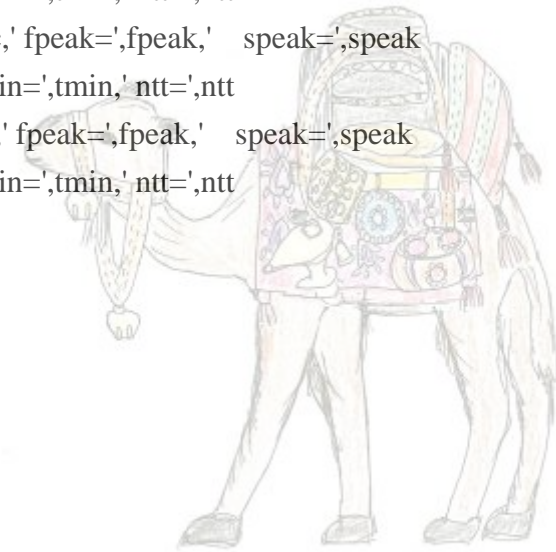
```



```

rteta0=teta0*pai/180.0
ixy=7
fmax=1./tmin
fmin=1./tmax
df=(fmax-fmin)/nspec
dt=1./(2.*nspec*df)
ddt=t31/dtt

```

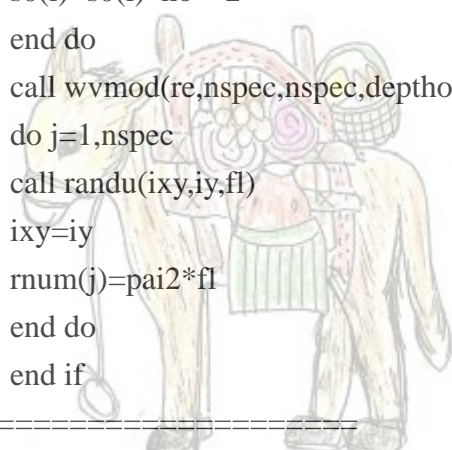


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```

if(itpspc.eq.1) call bm0(s0,nspec,nspec,h31,t31,dt)
if(itpspc.eq.2) call bms(s0,nspec,nspec,h31,t31,dt)
if(itpspc.eq.3) call jonswap(s0,nspec,nspec,h31,t31,dt)
if(itpspc.eq.4) call specin(s0,nspec,nspec,dt,e25,f25,fpeak,speak)
do i=1,nspec
s0(i)=s0(i)*ho**2
end do
call wvmod(re,nspec,nspec,deptho,dt,tmax,tmin,board_type,hkk)
do j=1,nspec
call randu(ixy,iy,fl)
ixy=iy
rnum(j)=pai2*fl
end do
end if

```



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```

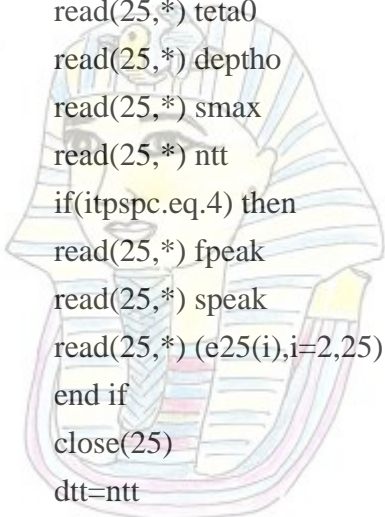
!=====
if(wave.eq.5) then
open(26,載滿貨品的驢子
/file=path//'muti_surface.dat',form='formatted',status='replace')
open(27,file=path//'muti_hw.dat',form='formatted',
& status='replace')
open(24,file=path//'muti_mass.dat',form='formatted',
& status='replace')

```

```

open(25,file=path/'muti.dat')
read(25,*) itpspc
read(25,*) t31
read(25,*) h31
read(25,*) teta0
read(25,*) deptho
read(25,*) smax
read(25,*) ntt
if(itpspc.eq.4) then
read(25,*) fpeak
read(25,*) speak
read(25,*) (e25(i),i=2,25)
end if
close(25)
dtt=ntt
h31=h31*ho
depth=deptho*ho
tmin=0.5
tmax=2.5

```



載滿珠寶的駱駝

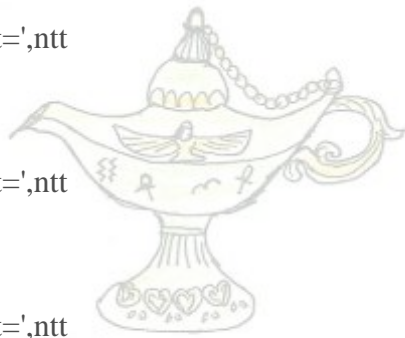
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```

if(itpspc.ne.4) then
write(24,*) 'spc_type=',itpspc,' h31=',h31,
/ ' t31=',t31,' teta0=',teta0,' smax=',smax
/ ', w=',x(nj1),' l=',y(nt1),' tmin=',tmin,' ntt=',ntt
write(26,*) 'spc_type=',itpspc,' h31=',h31,
/ ' t31=',t31,' teta0=',teta0,' smax=',smax
/ ', w=',x(nj1),' l=',y(nt1),' tmin=',tmin,' ntt=',ntt
write(27,*) 'spc_type=',itpspc,' h31=',h31,
/ ' t31=',t31,' teta0=',teta0,' smax=',smax
/ ', w=',x(nj1),' l=',y(nt1),' tmin=',tmin,' ntt=',ntt
write(*,*) 'spc_type=',itpspc,' h31=',h31,
/ ' t31=',t31,' teta0=',teta0,' smax=',smax
/ ', w=',x(nj1),' l=',y(nt1),' tmin=',tmin,' ntt=',ntt
else
write(24,*) 'spc_type=',itpspc,' fpeak=',fpeak,' speak=',speak
/ ', w=',x(nj1),' l=',y(nt1),' tmin=',tmin,' ntt=',ntt
write(26,*) 'spc_type=',itpspc,' fpeak=',fpeak,' speak=',speak
/ ', w=',x(nj1),' l=',y(nt1),' tmin=',tmin,' ntt=',ntt
write(27,*) 'spc_type=',itpspc,' fpeak=',fpeak,' speak=',speak

```

載滿貨品的驢子

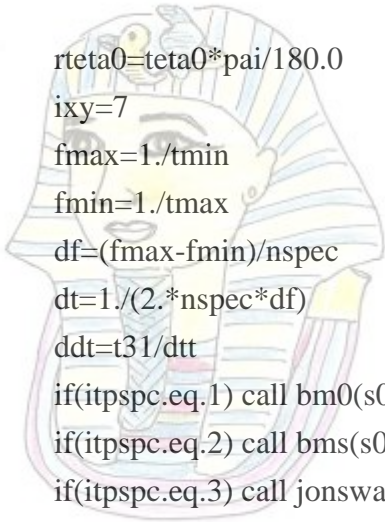


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```

/ , w=',x(nj1),' l=',y(nt1),' tmin=',tmin,' ntt=',ntt
write( *,*) 'spc_type=',itpspc,' fpeak=',fpeak,' speak=',speak
/ , w=',x(nj1),' l=',y(nt1),' tmin=',tmin,' ntt=',ntt
end if

```



```

rteta0=teta0*pai/180.0
ixy=7
fmax=1./tmin
fmin=1./tmax
df=(fmax-fmin)/nspec
dt=1./(2.*nspec*df)
ddt=t31/dtt
if(itpspc.eq.1) call bm0(s0,nspec,nspec,h31,t31,dt)
if(itpspc.eq.2) call bms(s0,nspec,nspec,h31,t31,dt)
if(itpspc.eq.3) call jonswap(s0,nspec,nspec,h31,t31,dt)
if(itpspc.eq.4) call specin(s0,nspec,nspec,dt,e25,f25,fpeak,speak)
do i=1,nspec
s0(i)=s0(i)*ho**2
end do
call wvmod(re,nspec,nspec,deptho,dt,tmax,tmin,board_type,hkk)

```

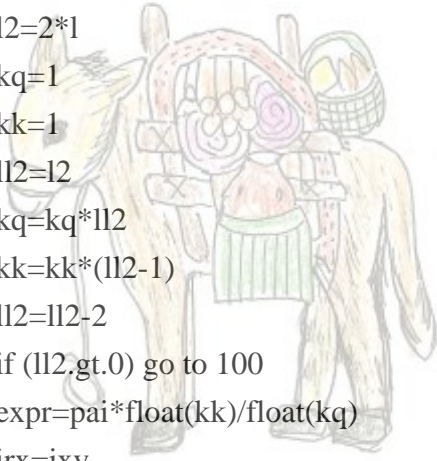
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!===== direction =====

```

l=int(0.11*smax+0.55)
l2=2*l
kq=1
kk=1
ll2=ll2
100 kq=kq*ll2
kk=kk*(ll2-1)
ll2=ll2-2
if (ll2.gt.0) go to 100
expr=pai*float(kk)/float(kq)
irx=ixy
do j=1,nspec
210 call randu(irx,iry,fl)
irx=iry
rcon=fl*expr
thetal=0.0
thetar=pai

```



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```
200  thetam=(thetal+thetar)/2.0
```

```
    thetad=(thetar-thetal)
```

```
    qi=thetam
```

```
    alfa=thetam
```

```
    do n=1,l
```

```
        qi=((sin(alfa)*(cos(alfa))**(2*n-1))+(2*n-1)*qi)/(2*n)
```

```
    end do
```

```
    def=qi-rcon
```

```
    if(def .eq. 0.0) go to 300
```

```
    if(def .gt. 0.0) thetar=thetam
```

```
    if(def .lt. 0.0) thetal=thetam
```

```
    if(thetad .ge. -0.0017) go to 200
```

```
300  thetam=thetam+rteta0
```

```
    if (teta0 .lt. 90.0) then
```

```
        if (thetam.le.0.0 .or. thetam.ge.rteta0) goto 210
```

```
    end if
```

```
    if (teta0 .gt. 90.0) then
```

```
        if (thetam.le.rteta0 .or. thetam.ge.pai) goto 210
```

```
    end if
```

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```
    theta(j)=thetam
```

```
end do
```

```
do j=1,nspec
```

```
    call randu(ixy,iy,fl)
```

```
    ixy=iy
```

```
    rnum(j)=pai2*fl
```

```
end do
```

```
end if
```

```
!***** begin to repeat *****
```

```
    write(24,"(5a12)") 'tx','mas','eng','ek','ep'
```

```
    maso=depth*x(nt1)*y(nt1)
```

```
    engo=9.81*depth*ni1*nj1
```

```
!-----
```

```
    istart=start*1000
```

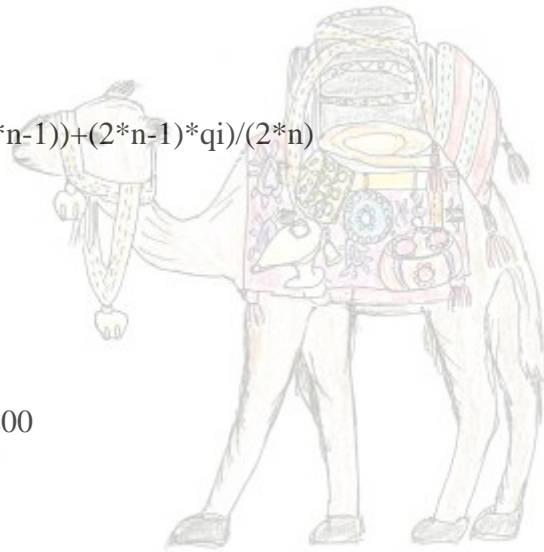
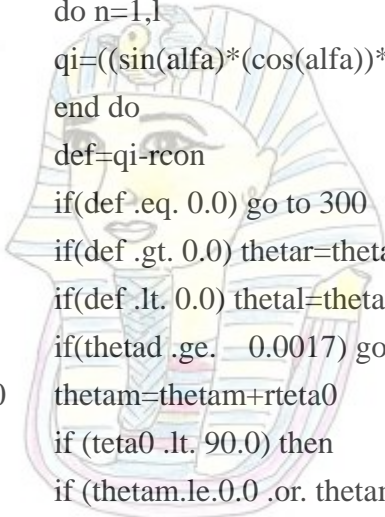
```
    iend=end*1000
```

```
    istart1=istart+1
```

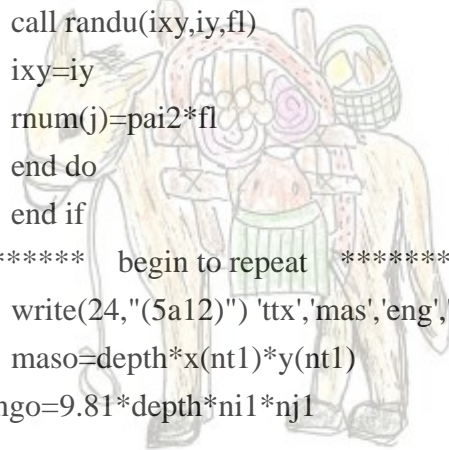
```
    iend1=iend
```

```
    if(icase.ne.1) istart1=1
```

```
    if(icase.ne.1) iend1=iend-istart
```



載滿珠寶的駱駝

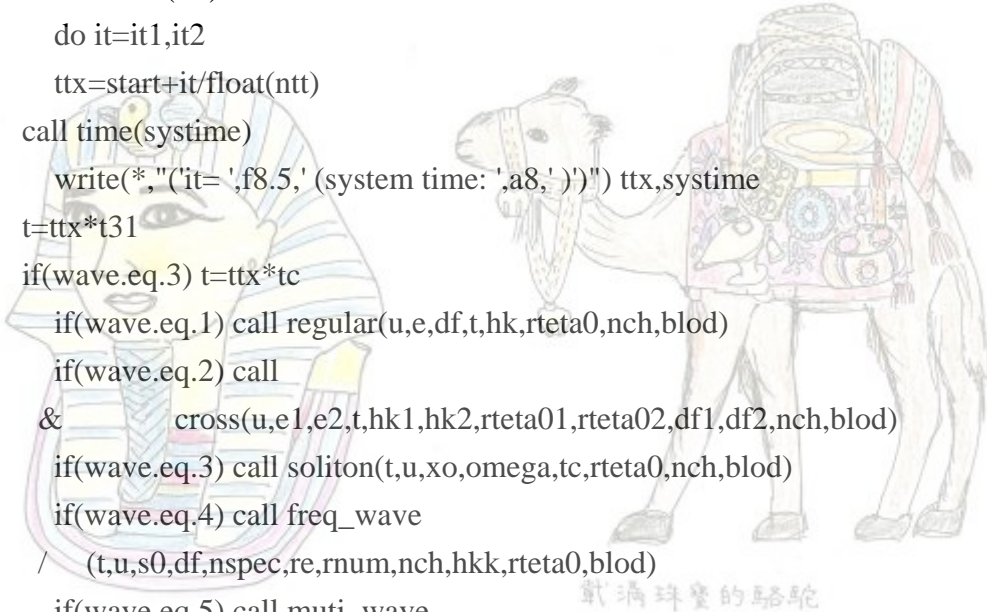


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```

do itt=istart1,iend1
it1=1+float(ntt)/1000*(itt-1)
it2=float(ntt)/1000*itt
do it=it1,it2
tx=start+it/float(ntt)
call time(systemtime)
write(*, "('it= ',f8.5,' (system time: ',a8,')')") ttx,systemtime
t=ttx*t31
if(wave.eq.3) t=ttx*tc
if(wave.eq.1) call regular(u,e,df,t,hk,rteta0,nch,blod)
if(wave.eq.2) call
& cross(u,e1,e2,t,hk1,hk2,rteta01,rteta02,df1,df2,nch,blod)
if(wave.eq.3) call soliton(t,u,xo,omega,tc,rteta0,nch,blod)
if(wave.eq.4) call freq_wave
/ (t,u,s0,df,nspec,re,rnum,nch,hkk,rteta0,blod)
if(wave.eq.5) call muti_wave
/(t,u,s0,df,nspec,re,rnum,nch,hkk,blod,theta)

```



載滿珠寶的駱駝

!=====

```

if(umu.ne.0.and.teta0.ne.90.and.wave.ne.5) then

```

```

do ki=1,ni2
do kj=1,nu0
i=kj+nj2*(ki-1)
u(kj)=0
end do
do kj=nj1-nu0+1,nj1
i=kj+nj2*(ki-1)
u(kj)=0
end do
end do
end if

```

!=====

```

do ki=1,ni2
do kj=1,nj2
i=kj+nj2*(ki-1)
f2b(i)=-u(kj)
end do
end do

```

載珠寶的驢子



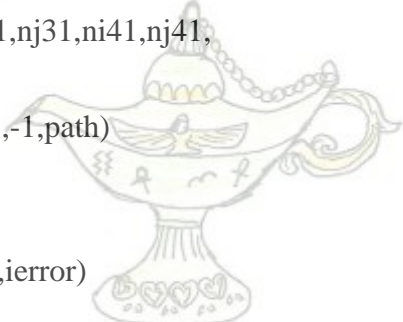
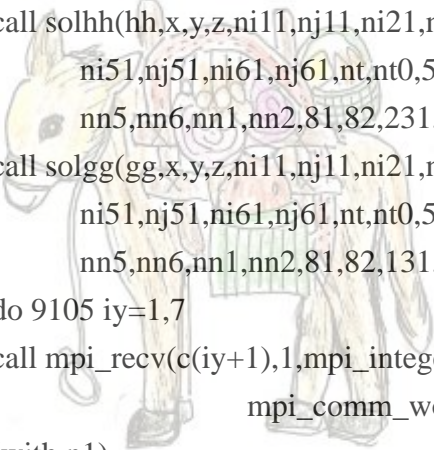
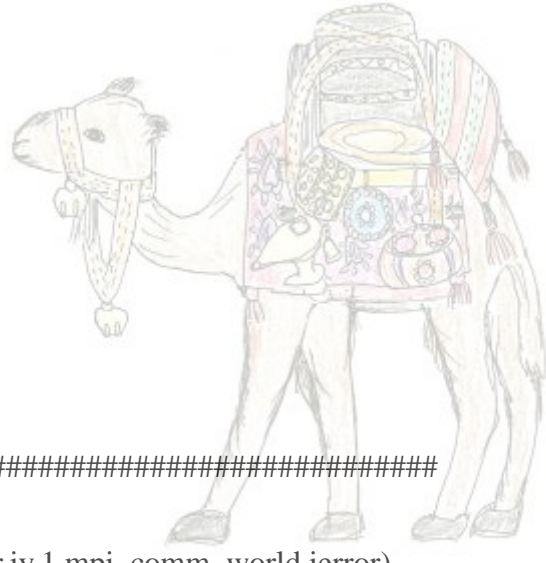
阿拉丁神燈

!*****

```

call openfilen(11,12,path)
write(11) (z(i),x(i),y(i),i=1,nt)
close(11)
call openfilen(11,13,path)
write(11) (f1(i),i=1,nt1)
close(11)
call openfilen(11,15,path)
write(11) (f2b(i),i=1,nt2)
close(11)
call openfilen(11,14,path)
write(11) (f1b(i),i=1,nt1)
close(11)
!#####
do 9103 iy=1,7
9103 call mpi_send(9,1,mpi_integer,iy,1,mpi_comm_world,ierror)
! hh & gg (B11,B31)
call solhh(hh,x,y,z,ni11,nj11,ni21,nj21,ni31,nj31,ni41,nj41,
& ni51,nj51,ni61,nj61,nt,nt0,1,2,1,2,
& nn1,nn2,nn1,nn2,81,82,211,ist1,jst1,-1,path)
call solgg(gg,x,y,z,ni11,nj11,ni21,nj21,ni31,nj31,ni41,nj41,
& ni51,nj51,ni61,nj61,nt,nt0,1,2,1,2,
& nn1,nn2,nn1,nn2,81,82,111,ist1,jst1,-1,path)
call solhh(hh,x,y,z,ni11,nj11,ni21,nj21,ni31,nj31,ni41,nj41,
& ni51,nj51,ni61,nj61,nt,nt0,5,6,1,2,
& nn5,nn6,nn1,nn2,81,82,231,ist3,jst1,-1,path)
call solgg(gg,x,y,z,ni11,nj11,ni21,nj21,ni31,nj31,ni41,nj41,
& ni51,nj51,ni61,nj61,nt,nt0,5,6,1,2,
& nn5,nn6,nn1,nn2,81,82,131,ist3,jst1,-1,path)
do 9105 iy=1,7
9105 call mpi_recv(c(iy+1),1,mpi_integer,iy,1,
& mpi_comm_world,stat,ierror)
! B33^ (with n1)
call mpi_send(9,1,mpi_integer,4,15,mpi_comm_world,ierror)
call mpi_send(9,1,mpi_integer,2,13,mpi_comm_world,ierror)
call mpi_send(7,1,mpi_integer,1,12,mpi_comm_world,ierror)
call mir2_1(hh,gg,nt0,nn5,nn6,133,71,1,path)
call mpi_recv(c(1),1,mpi_integer,1,12,mpi_comm_world,stat,ierror)
call mir2_3(hh,nt0,nn5,nn6,71,72,333,path)

```



```

! B33^ *B34 (with n1)
    call mpi_send(7,1,mpi_integer,1,12,mpi_comm_world,ierror)
    call mtr2_1(hh,gg,nt0,nn5,nn6,nn5,nn6,nn7,nn8,
&    333,134,71,1,61,path)
    call mpi_recv(c(1),1,mpi_integer,1,12,mpi_comm_world,stat,ierror)
    call mtr2_3(hh,nt0,nn5,nn6,nn7,nn8,71,72,334,path)
! B43 * [B33^ *B34] (with n1)
    call mpi_send(7,1,mpi_integer,1,12,mpi_comm_world,ierror)
    call mtr2_1(hh,gg,nt0,nn7,nn8,nn5,nn6,nn7,nn8,
&    143,334,71,1,61,path)
    call mpi_recv(c(1),1,mpi_integer,1,12,mpi_comm_world,stat,ierror)
    call mtr2_3(hh,nt0,nn7,nn8,nn7,nn8,71,72,444,path)
! B44 - [B43 * B33^ *B34] (only n0)
    call sa2(hh,gg,nt0,nn7,nn8,nn7,nn8,144,444,344,path)
! [B44 - B43 * B33^ *B34]^ (with n1)
    call mpi_send(7,1,mpi_integer,1,12,mpi_comm_world,ierror)
    call mir2_1(hh,gg,nt0,nn7,nn8,344,71,1,path)
    call mpi_recv(c(1),1,mpi_integer,1,12,mpi_comm_world,stat,ierror)
    call mir2_3(hh,nt0,nn7,nn8,71,72,444,path)
! [- B33^ * B34][B44 - B43 * B33^ * B34]^ (with n1)
    call mpi_send(7,1,mpi_integer,1,12,mpi_comm_world,ierror)
    call mtr2_1(hh,gg,nt0,nn5,nn6,nn7,nn8,nn7,nn8,
&    334,444,71,-1,61,path)
    call mpi_recv(c(1),1,mpi_integer,1,12,mpi_comm_world,stat,ierror)
    call mtr2_3(hh,nt0,nn5,nn6,nn7,nn8,71,72,434,path)
    call mpi_recv(c(3),1,mpi_integer,2,13,mpi_comm_world,stat,ierror)
! A22^ * A21
    call mpi_send(9,1,mpi_integer,1,12,mpi_comm_world,ierror)
    call mpi_send(9,1,mpi_integer,2,13,mpi_comm_world,ierror)
    call mpi_send(9,1,mpi_integer,3,14,mpi_comm_world,ierror)
    call mtr4_1(hh,gg,nt0,nn5,nn6,nn7,nn8,nn5,nn6,nn7,nn8,nn1,nn2,nn3,
&    nn4,433,434,443,444,131,132,
&    141,142,331,332,341,342,1,71,61,51,path)
    call mpi_recv(c(2),1,mpi_integer,1,12,mpi_comm_world,stat,ierror)
    call mpi_recv(c(3),1,mpi_integer,2,13,mpi_comm_world,stat,ierror)
    call mpi_recv(c(4),1,mpi_integer,3,14,mpi_comm_world,stat,ierror)
! A12 * [A22^ * A21]
    call mpi_send(9,1,mpi_integer,1,12,mpi_comm_world,ierror)

```

```

call mpi_send(9,1,mpi_integer,2,13,mpi_comm_world,ierror)
call mpi_send(9,1,mpi_integer,3,14,mpi_comm_world,ierror)
call mtr4_1(hh,gg,nt0,nn1,nn2,nn3,nn4,nn5,nn6,nn7,nn8,nn1,nn2,nn3,
& nn4,113,114,123,124,331,332,
& 341,342,511,512,521,522,1,71,61,51,path)
call mpi_recv(c(2),1,mpi_integer,1,12,mpi_comm_world,stat,ierror)
call mpi_recv(c(3),1,mpi_integer,2,13,mpi_comm_world,stat,ierror)
call mpi_recv(c(4),1,mpi_integer,3,14,mpi_comm_world,stat,ierror)
! A11 - A12 * [A22^ * A21]
call mpi_send(9,1,mpi_integer,1,12,mpi_comm_world,ierror)
call mpi_send(9,1,mpi_integer,2,13,mpi_comm_world,ierror)
call mpi_send(9,1,mpi_integer,3,14,mpi_comm_world,ierror)
call sa2(hh,gg,nt0,nn1,nn2,nn1,nn2,111,511,611,path)
call mpi_recv(c(2),1,mpi_integer,1,12,mpi_comm_world,stat,ierror)
call mpi_recv(c(3),1,mpi_integer,2,13,mpi_comm_world,stat,ierror)
call mpi_recv(c(4),1,mpi_integer,3,14,mpi_comm_world,stat,ierror)
! B11^ (with n1)
call mpi_send(9,1,mpi_integer,2,13,mpi_comm_world,ierror)
call mpi_send(7,1,mpi_integer,1,12,mpi_comm_world,ierror)
call mir2_1(hh,gg,nt0,nn1,nn2,611,71,1,path)
call mpi_recv(c(1),1,mpi_integer,1,12,mpi_comm_world,stat,ierror)
call mir2_3(hh,nt0,nn1,nn2,71,72,411,path)
! B11^ * B12 (with n1)
call mpi_send(7,1,mpi_integer,1,12,mpi_comm_world,ierror)
call mtr2_1(hh,gg,nt0,nn1,nn2,nn1,nn2,nn3,nn4,
& 411,612,71,1,61,path)
call mpi_recv(c(1),1,mpi_integer,1,12,mpi_comm_world,stat,ierror)
call mtr2_3(hh,nt0,nn1,nn2,nn3,nn4,71,72,412,path)
! B21 * [B11^ * B12] (with n1)
call mpi_send(7,1,mpi_integer,1,12,mpi_comm_world,ierror)
call mtr2_1(hh,gg,nt0,nn3,nn4,nn1,nn2,nn3,nn4,
& 621,412,71,1,61,path)
call mpi_recv(c(1),1,mpi_integer,1,12,mpi_comm_world,stat,ierror)
call mtr2_3(hh,nt0,nn3,nn4,nn3,nn4,71,72,522,path)
! B22 - [B21 * B11^ * B12] (only n0)
call sa2(hh,gg,nt0,nn3,nn4,nn3,nn4,622,522,422,path)
! [B22 - B21 * B11^ * B12]^ (with n1)
call mpi_send(7,1,mpi_integer,1,12,mpi_comm_world,ierror)

```



```

call mir2_1(hh,gg,nt0,nn3,nn4,422,71,1,path)
call mpi_recv(c(1),1,mpi_integer,1,12,mpi_comm_world,stat,ierror)
call mir2_3(hh,nt0,nn3,nn4,71,72,522,path)
! [- B11^ * B12][B22 - B21 * B11^ * B12]^ (with n1)
call mpi_send(7,1,mpi_integer,1,12,mpi_comm_world,ierror)
call mtr2_1(hh,gg,nt0,nn1,nn2,nn3,nn4,nn3,nn4,
& 412,522,71,-1,61,path)
call mpi_recv(c(1),1,mpi_integer,1,12,mpi_comm_world,stat,ierror)
call mtr2_3(hh,nt0,nn1,nn2,nn3,nn4,71,72,512,path)
call mpi_recv(c(3),1,mpi_integer,2,13,mpi_comm_world,stat,ierror)
! [-A22^ * A21] * [A11 - A12 * A22^ * A21]^
call mpi_send(9,1,mpi_integer,1,12,mpi_comm_world,ierror)
call mpi_send(9,1,mpi_integer,2,13,mpi_comm_world,ierror)
call mpi_send(9,1,mpi_integer,3,14,mpi_comm_world,ierror)
call mtr4_1(hh,gg,nt0,nn5,nn6,nn7,nn8,nn1,nn2,nn3,nn4,nn1,nn2,nn3,
& nn4,331,332,341,342,511,512,
& 521,522,531,532,541,542,-1,71,61,51,path)
call mpi_recv(c(2),1,mpi_integer,1,12,mpi_comm_world,stat,ierror)
call mpi_recv(c(3),1,mpi_integer,2,13,mpi_comm_world,stat,ierror)
call mpi_recv(c(4),1,mpi_integer,3,14,mpi_comm_world,stat,ierror)
call mpi_recv(c(5),1,mpi_integer,4,15,mpi_comm_world,stat,ierror)

do 9115 iy=1,7
9115 call mpi_send(9,1,mpi_integer,iy,1,mpi_comm_world,ierror)
call solf1b1(hh,f1,f1b,f2b,nt0,nt1,nt2,nn1,nn2,nn3,nn4,nn5,nn6,
& nn7,nn8,1,211,212,213,214,51,path)
do 9117 iy=1,7
9117 call mpi_recv(c(iy+1),1,mpi_integer,iy,1,
& mpi_comm_world,stat,ierror)

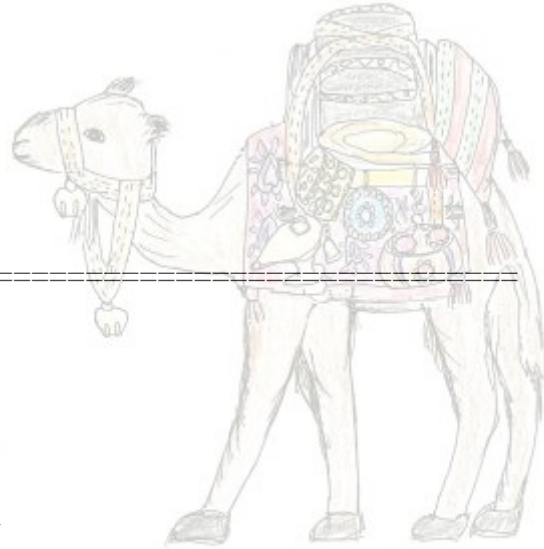
do 9119 iy=1,7
9119 call mpi_send(9,1,mpi_integer,iy,1,mpi_comm_world,ierror)
call solf1b2(hh,f1,f1b,nt0,nt1,nn1,nn2,nn3,nn4,nn5,nn6,
& nn7,nn8,1,511,512,513,514,51,61,path)
do 9121 iy=1,7
9121 call mpi_recv(c(iy+1),1,mpi_integer,iy,1,
& mpi_comm_world,stat,ierror)

```

```
call solf1b3(f1b,nt1,nn1,nn2,nn3,nn4,nn5,nn6,61,14,path)
```

```
!#####
```

```
call openfileo(11,13,path)
READ(11) (f1(i),i=1,nt1)
close(11)
call openfileo(11,14,path)
read(11) (f1b(i),i=1,nt1)
close(11)
```



```
!-----
```

```
do ki=1,ni1
do kj=1,nj1
nstart=0
i=kj+nj1*(ki-1)
if(ki.ne.ni1.and.kj.ne.nj1) then
call xx_x_6(xx,yy,zz,x,y,z,nt,nj11,ki,kj,nstart)
call normal(xx,yy,zz,xn,yn,zn,a)
```

載滿珠寶的駱駝

```
xt1=xx(1)
```

```
xt2=xx(2)
```

```
xt3=xx(3)
```

```
xt4=xx(4)
```

```
yt1=yy(1)
```

```
yt2=yy(2)
```

```
yt3=yy(3)
```

```
yt4=yy(4)
```

```
zt1=zz(1)
```

```
zt2=zz(2)
```

```
zt3=zz(3)
```

```
zt4=zz(4)
```

```
p1=-1
```

```
p2=-1
```

```
xp(1,1)=.25*((-1+p2)*xt1+( 1-p2)*xt2+(1+p2)*xt3+(-1-p2)*xt4)
```

```
xp(2,1)=.25*((-1+p1)*xt1+(-1-p1)*xt2+(1+p1)*xt3+( 1-p1)*xt4)
```

```
xp(3,1)=xn
```

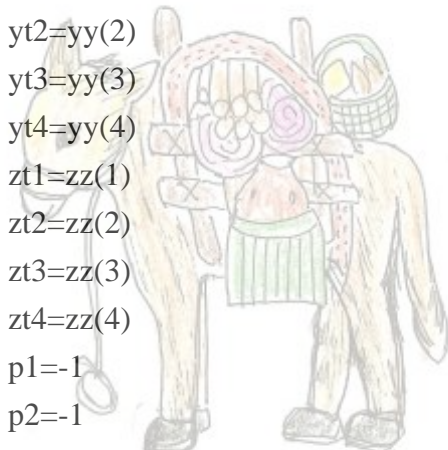
```
xp(1,2)=.25*((-1+p2)*yt1+( 1-p2)*yt2+(1+p2)*yt3+(-1-p2)*yt4)
```

```
xp(2,2)=.25*((-1+p1)*yt1+(-1-p1)*yt2+(1+p1)*yt3+( 1-p1)*yt4)
```

```
xp(3,2)=-yn
```

```
xp(1,3)=.25*((-1+p2)*zt1+( 1-p2)*zt2+(1+p2)*zt3+(-1-p2)*zt4)
```

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```

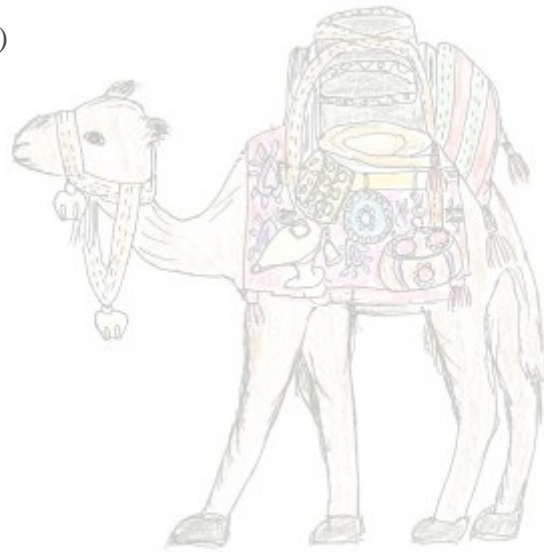
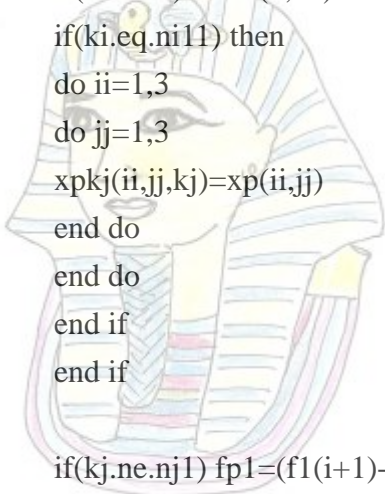
xp(2,3)=.25*((-1+p1)*zt1+(-1-p1)*zt2+(1+p1)*zt3+(1-p1)*zt4)
xp(3,3)=-zn

```

```

call minvs(xp,3,3,0.000001,ill)
if(ill.ne.0) write(*,11) ill
if(ki.eq.ni1) then
do ii=1,3
do jj=1,3
xpkj(ii,jj,kj)=xp(ii,jj)
end do
end do
end if
end if

```



載滿珠寶的駱駝

```

if(kj.ne.nj1) fp1=(f1(i+1)-f1(i))/2.
if(kj.eq.nj1) fp1=-(f1(i)-f1(i-1))/2.
if(ki.ne.ni1) fp2=(f1(i+nj1)-f1(i))/2.
if(ki.eq.ni1) fp2=-(f1(i)-f1(i-nj1))/2.

```

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```
fp3=f1b(i)
```

```

if(ki.eq.ni1) then
do ii=1,3
do jj=1,3
xp(ii,jj)=xpkj(ii,jj,kj)
end do
end do
end if

```

```

fx=xp(1,1)*fp1 +xp(1,2)*fp2 +xp(1,3)*fp3
fy=xp(2,1)*fp1 +xp(2,2)*fp2 +xp(2,3)*fp3
fz=xp(3,1)*fp1 +xp(3,2)*fp2 +xp(3,3)*fp3

```

載滿貨品的驢子



阿拉丁神燈

```

if(ki.eq.1) fx=0
if(ki.eq.ni1) fy=0
if(kj.eq.1.or.kj.eq.nj1) fz=0

```

```
if(teta0.eq.90) fx=0
```

```

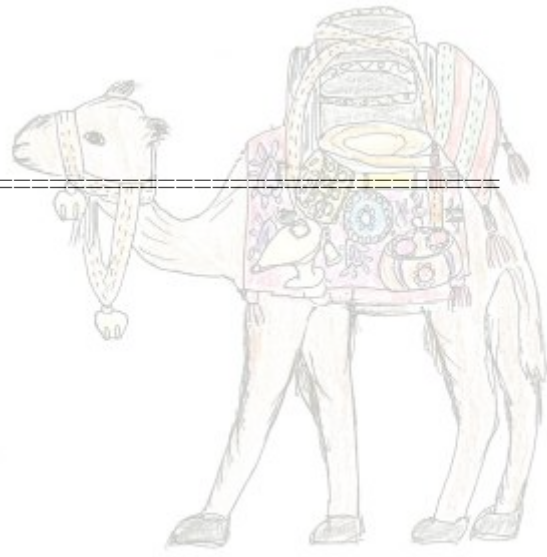
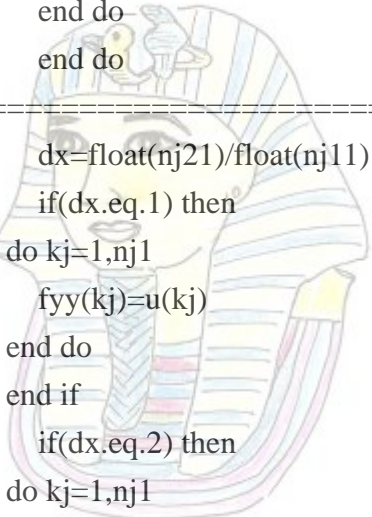
fxx(i)=fx
fyy(i)=fy
fzz(i)=fz

```

```

end do
end do
=====
dx=float(nj21)/float(nj11)
if(dx.eq.1) then
do kj=1,nj1
fyy(kj)=u(kj)
end do
end if
if(dx.eq.2) then
do kj=1,nj1
fyy(kj)=u(1+(kj-1)*2)
end do
end if

```



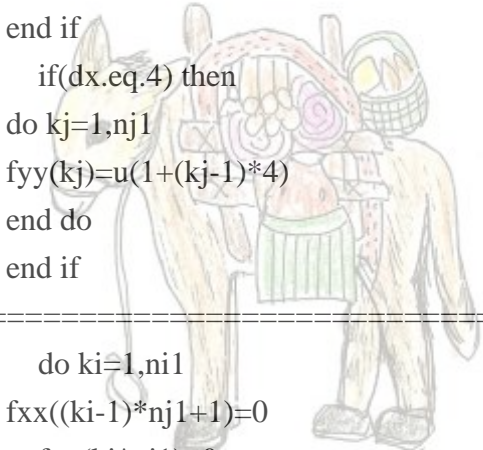
戴滿珠寶的駱駝

2011 埃及尼羅河之旅

```

if(dx.eq.3) then
do kj=1,nj1
fyy(kj)=u(1+(kj-1)*3)
end do
end if
if(dx.eq.4) then
do kj=1,nj1
fyy(kj)=u(1+(kj-1)*4)
end do
end if

```



阿拉丁神燈

```

=====
do ki=1,ni1
fxx((ki-1)*nj1+1)=0
fxx(ki*nj1)=0
end do

```

載滿貨品的驢子

```

=====
do ki=1,ni1
fyy((ki-1)*nj1+1)=fyy((ki-1)*nj1+2)
fyy(ki*nj1)=fyy(ki*nj1-1)
end do

```

!=====

```

do ki=1,ni1
fzz((ki-1)*nj1+1)=fzz((ki-1)*nj1+2)
fzz(ki*nj1)=fzz(ki*nj1-1)
end do

```

!=====

```

do kj=1,nj1
fyy(ni11*nj1+kj)=0
end do

```

!=====

```

if(i_dis.ne.0) then
do ki=i_dis,i_dis
do kj=1,nj1
fyy(kj+(ki-1)*nj1)=(fyy(kj+(ki-2)*nj1)+fyy(kj+ki*nj1))/2
end do
end do
end if

```

!=====

! go to 3838 2011 埃及尼羅河之旅

```

do kij=1,1
do ki=1,ni1
ii=(ki-1)*nj1
do kj=2,nj11
fzz(ii+kj)=(fzz(ii+kj-1)+fzz(ii+kj)+fzz(ii+kj+1))/3
end do
fzz(ki*nj1)=(fzz(ki*nj1)+fzz(ki*nj1-1)+fzz(ki*nj1-2))/3
fzz(ii+1)=(fzz(ii+1)+fzz(ii+2)+fzz(ii+3))/3
end do
end do

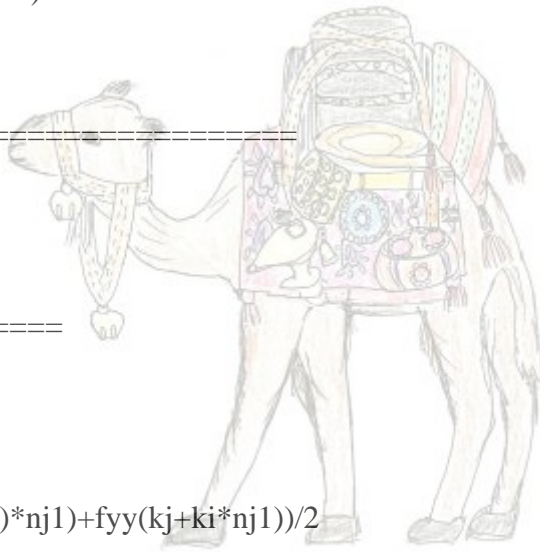
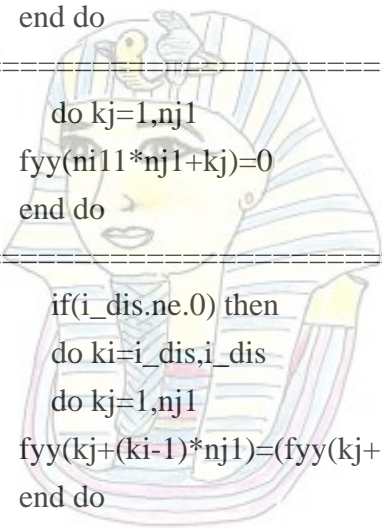
```

!=====

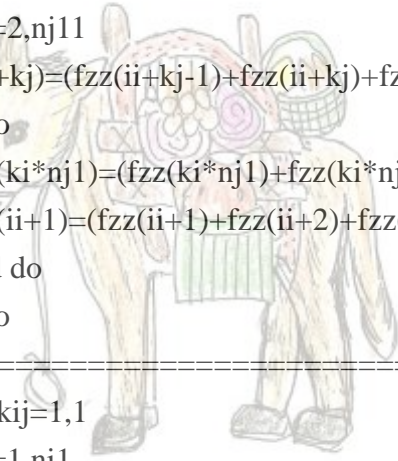
```

do kij=1,1
do ki=1,ni1
ii=(ki-1)*nj1
do kj=nj11,2,-1
fzz(ii+kj)=(fzz(ii+kj-1)+fzz(ii+kj)+fzz(ii+kj+1))/3
end do
fzz(ki*nj1)=(fzz(ki*nj1)+fzz(ki*nj1-1)+fzz(ki*nj1-2))/3
fzz(ii+1)=(fzz(ii+1)+fzz(ii+2)+fzz(ii+3))/3

```



載滿珠寶的駱駝



載珠寶的馬廐子

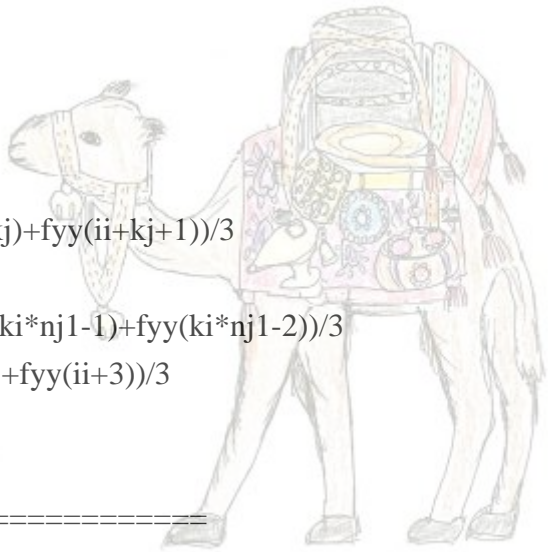
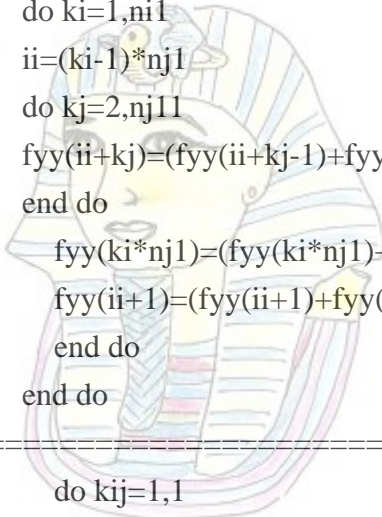


阿拉丁神燈

```

end do
end do
!=====
do kij=1,1
do ki=1,ni1
ii=(ki-1)*nj1
do kj=2,nj11
fyy(ii+kj)=(fyy(ii+kj-1)+fyy(ii+kj)+fyy(ii+kj+1))/3
end do
fyy(ki*nj1)=(fyy(ki*nj1)+fyy(ki*nj1-1)+fyy(ki*nj1-2))/3
fyy(ii+1)=(fyy(ii+1)+fyy(ii+2)+fyy(ii+3))/3
end do
end do
!=====

```

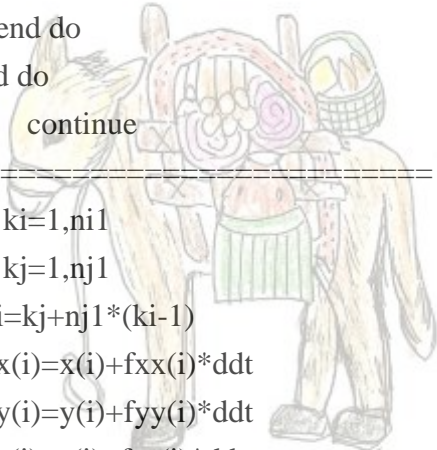


載滿珠寶的駱駝

```

do kij=1,1
do ki=1,ni1
ii=(ki-1)*nj1
do kj=nj11,2,-1
fyy(ii+kj)=(fyy(ii+kj-1)+fyy(ii+kj)+fyy(ii+kj+1))/3
end do
fyy(ki*nj1)=(fyy(ki*nj1)+fyy(ki*nj1-1)+fyy(ki*nj1-2))/3
fyy(ii+1)=(fyy(ii+1)+fyy(ii+2)+fyy(ii+3))/3
end do
end do
3838 continue
!=====

```



載滿貨品的驢子



阿拉丁神燈

```

do ki=1,ni1
do kj=1,nj1
i=kj+nj1*(ki-1)
x(i)=x(i)+fxx(i)*ddt
y(i)=y(i)+fyy(i)*ddt
z(i)=z(i)+fzz(i)*ddt
end do
end do
!=====
if(wave.eq.2.or.wave.eq.5) go to 2323
do kij=1,10
do ki=1,ni1

```

ii=(ki-1)*nj1

do kj=nj1/2+1,nj11

z(ii+kj)=(z(ii+kj-1)+z(ii+kj)+z(ii+kj+1))/3

end do

do kj=nj1/2,2,-1

z(ii+kj)=(z(ii+kj-1)+z(ii+kj)+z(ii+kj+1))/3

end do

do kj=2,nj11

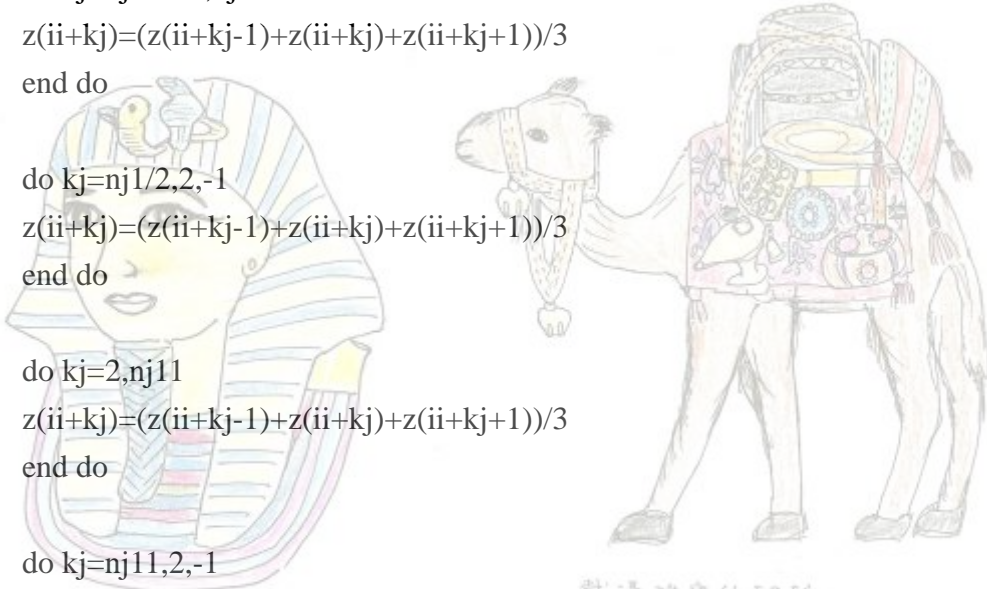
z(ii+kj)=(z(ii+kj-1)+z(ii+kj)+z(ii+kj+1))/3

end do

do kj=nj11,2,-1

z(ii+kj)=(z(ii+kj-1)+z(ii+kj)+z(ii+kj+1))/3

end do



載滿珠寶的駱駝

do kk=1,1

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z(nj1*(ki-1)+3)=

/(z(nj1*(ki-1)+2)+z(nj1*(ki-1)+3)+z(nj1*(ki-1)+4))/3

z(nj1*(ki-1)+2)=

/(z(nj1*(ki-1)+2)+z(nj1*(ki-1)+3)+z(nj1*(ki-1)+4))/3

z(nj1*(ki-1)+1)=

/(z(nj1*(ki-1)+1)+z(nj1*(ki-1)+2)+z(nj1*(ki-1)+3))/3

z(nj1*ki-2)=(z(nj1*ki-1)+z(nj1*ki-2)+z(nj1*ki-3))/3

z(nj1*ki-1)=(z(nj1*ki-1)+z(nj1*ki-2)+z(nj1*ki-3))/3

z(nj1*ki)=(z(nj1*ki-2)+z(nj1*ki-1)+z(nj1*ki))/3

end do

end do

end do

2323 continue 載滿貨品的驢子



阿拉丁神燈

!=====

do ki=1,ni2

do kj=1,nj2

i=nt1+kj+nj2*(ki-1)

y(i)=y(i)+u(kj)*ddt

```

end do
end do

```

```

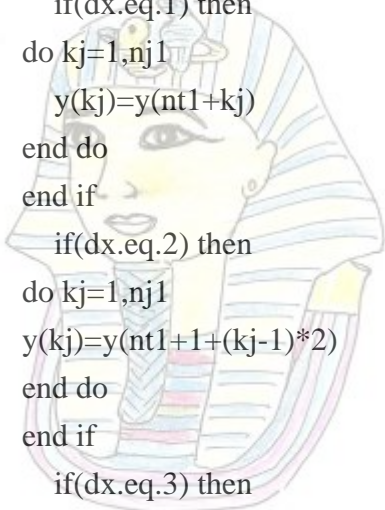
=====

```

```

dx=float(nj21)/float(nj11)
if(dx.eq.1) then
do kj=1,nj1
y(kj)=y(nt1+kj)
end do
end if
if(dx.eq.2) then
do kj=1,nj1
y(kj)=y(nt1+1+(kj-1)*2)
end do
end if
if(dx.eq.3) then
do kj=1,nj1
y(kj)=y(nt1+1+(kj-1)*3)
end do
end if
if(dx.eq.4) then
do kj=1,nj1
y(kj)=y(nt1+1+(kj-1)*4)
end do
end if

```



載滿珠寶的駱駝

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```

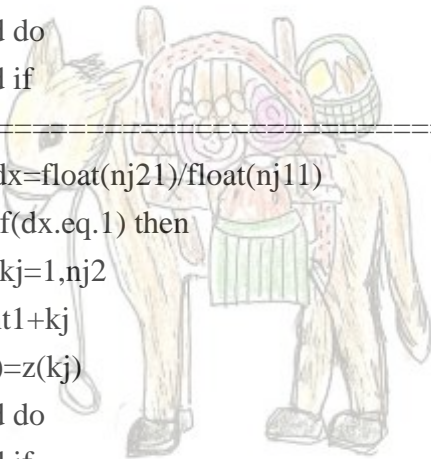
=====

```

```

dx=float(nj21)/float(nj11)
if(dx.eq.1) then
do kj=1,nj2
i=nt1+kj
z(i)=z(kj)
end do
end if
if(dx.eq.2) then
do kj=1,nj2,2
i=nt1+kj
j=1+(kj-1)/2
z(i)=z(j)
end do

```



載滿寶物的驢子



阿拉丁神燈


```

do kj=2,nj21,2
i=nt1+kj
z(i)=0.5*(z(kj-1)+z(kj+1))
end do
end if

```

```

if(dx.eq.3) then
do kj=1,nj2,3
i=nt1+kj
j=1+(kj-1)/3
z(i)=z(j)
end do
do kj=2,nj21-1,3
i=nt1+kj
z(i)=z((kj+1)/3)+(z((kj+4)/3)-z((kj+1)/3))/3
end do

```

```

do kj=3,nj21-2,3
i=nt1+kj
z(i)=z(kj/3)+2*(z((kj+3)/3)-z(kj/3))/3
end do
end if

```

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```

if(dx.eq.4) then
do kj=1,nj2,4
i=nt1+kj
j=1+(kj-1)/4
z(i)=z(j)
end do
do kj=2,nj21-2,4
i=nt1+kj
z(i)=z((kj+2)/4)+(z((kj+6)/4)-z((kj+2)/4))/4
end do

```

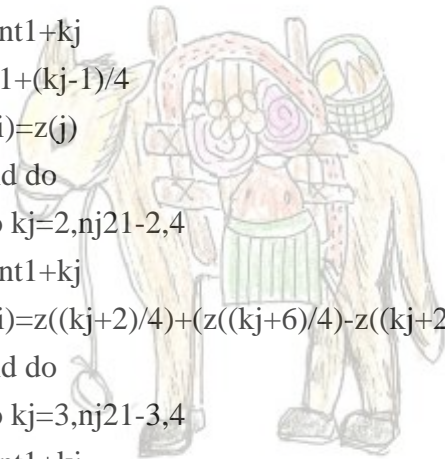
```

do kj=3,nj21-3,4
i=nt1+kj
z(i)=z((kj+1)/4)+2*(z((kj+5)/4)-z((kj+1)/4))/4
end do
do kj=4,nj21-4,4
i=nt1+kj
z(i)=z(kj/4)+3*(z((kj+4)/4)-z(kj/4))/4
end do

```



載滿珠寶的駱駝

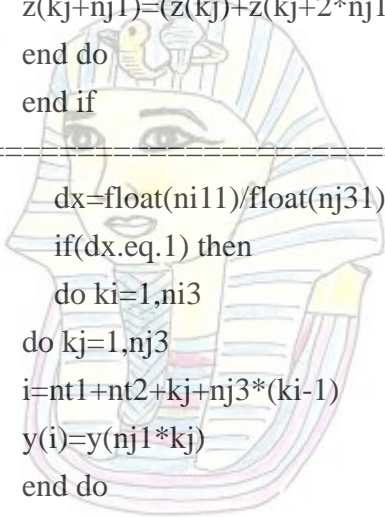


阿拉丁神燈

```

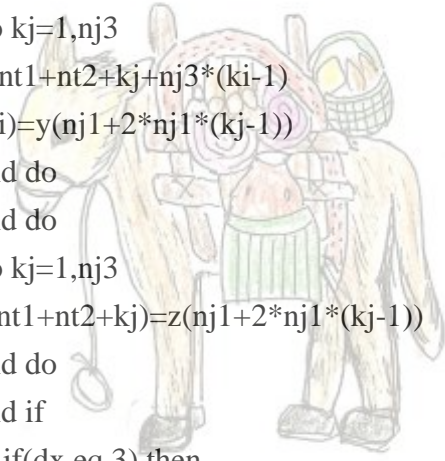
end if
!=====
!   if(wave.eq.3.or.wave.eq.1) then
!   do kj=1,nj1
!   z(kj+nj1)=(z(kj)+z(kj+2*nj1))/2
!   end do
!   end if
!=====
dx=float(ni11)/float(nj31)
if(dx.eq.1) then
do ki=1,ni3
do kj=1,nj3
i=nt1+nt2+kj+nj3*(ki-1)
y(i)=y(nj1*kj)
end do
end do
do kj=1,nj3
z(nt1+nt2+kj)=z(nj1*kj)
end do
end if
if(dx.eq.2) then
do ki=1,ni3
do kj=1,nj3
i=nt1+nt2+kj+nj3*(ki-1)
y(i)=y(nj1+2*nj1*(kj-1))
end do
end do
do kj=1,nj3
z(nt1+nt2+kj)=z(nj1+2*nj1*(kj-1))
end do
end if
if(dx.eq.3) then
do ki=1,ni3
do kj=1,nj3
i=nt1+nt2+kj+nj3*(ki-1)
y(i)=y(nj1+3*nj1*(kj-1))
end do
end do
end do

```



載滿珠寶的駱駝

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載滿寶品的馬廐子

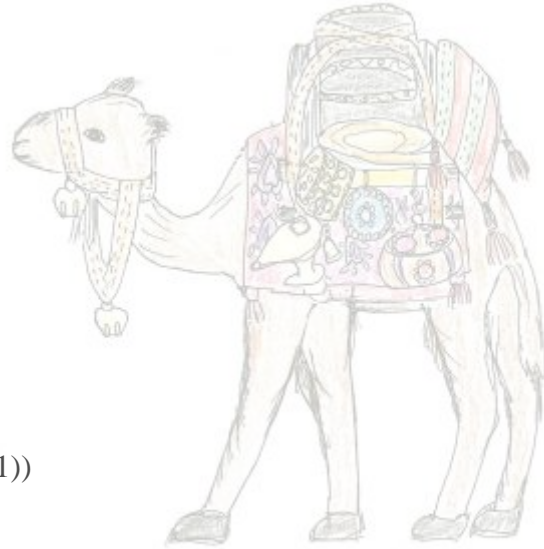
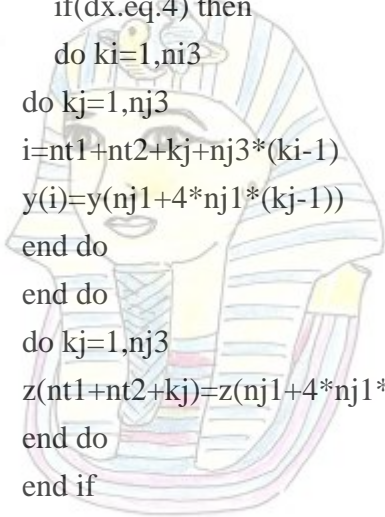


阿拉丁神燈

```

do kj=1,nj3
z(nt1+nt2+kj)=z(nj1+3*nj1*(kj-1))
end do
end if
if(dx.eq.4) then
do ki=1,ni3
do kj=1,nj3
i=nt1+nt2+kj+nj3*(ki-1)
y(i)=y(nj1+4*nj1*(kj-1))
end do
end do
do kj=1,nj3
z(nt1+nt2+kj)=z(nj1+4*nj1*(kj-1))
end do
end if

```



戴滿珠寶的駱駝

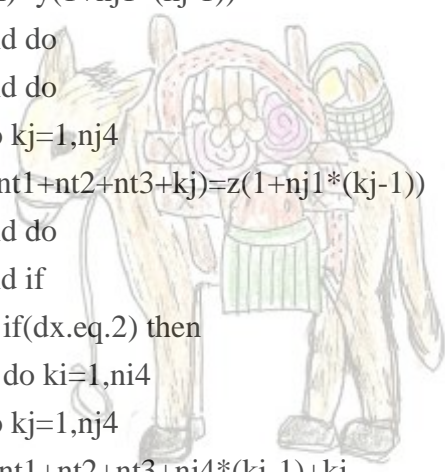
=====

```

dx=float(ni11)/float(nj41)
if(dx.eq.1) then
do ki=1,ni4
do kj=1,nj4
i=nt1+nt2+nt3+kj+nj4*(ki-1)
y(i)=y(1+nj1*(kj-1))
end do
end do
do kj=1,nj4
z(nt1+nt2+nt3+kj)=z(1+nj1*(kj-1))
end do
end if
if(dx.eq.2) then
do ki=1,ni4
do kj=1,nj4
i=nt1+nt2+nt3+nj4*(ki-1)+kj
y(i)=y(1+2*nj1*(kj-1))
end do
end do
do kj=1,nj4
z(nt1+nt2+nt3+kj)=z(1+2*nj1*(kj-1))
end do

```

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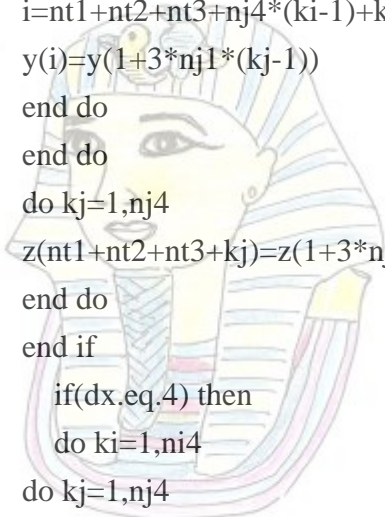


阿拉丁神燈

```

end if
  if(dx.eq.3) then
    do ki=1,ni4
      do kj=1,nj4
        i=nt1+nt2+nt3+nj4*(ki-1)+kj
        y(i)=y(1+3*nj1*(kj-1))
      end do
    end do
    do kj=1,nj4
      z(nt1+nt2+nt3+kj)=z(1+3*nj1*(kj-1))
    end do
  end if

```



戴滿珠寶的駱駝

```

  if(dx.eq.4) then
    do ki=1,ni4
      do kj=1,nj4
        i=nt1+nt2+nt3+nj4*(ki-1)+kj
        y(i)=y(1+4*nj1*(kj-1))
      end do
    end do
    do kj=1,nj4
      z(nt1+nt2+nt3+kj)=z(1+4*nj1*(kj-1))
    end do
  end if

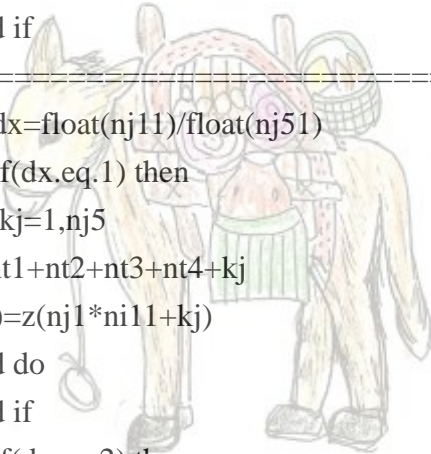
```

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```

dx=float(nj11)/float(nj51)
  if(dx.eq.1) then
    do kj=1,nj5
      i=nt1+nt2+nt3+nt4+kj
      z(i)=z(nj1*ni11+kj)
    end do
  end if
  if(dx.eq.2) then
    do kj=1,nj5
      i=nt1+nt2+nt3+nt4+kj
      z(i)=z(nj1*ni11+2*(kj-1)+1)
    end do
  end if
  if(dx.eq.3) then

```



載滿貨品的驢子

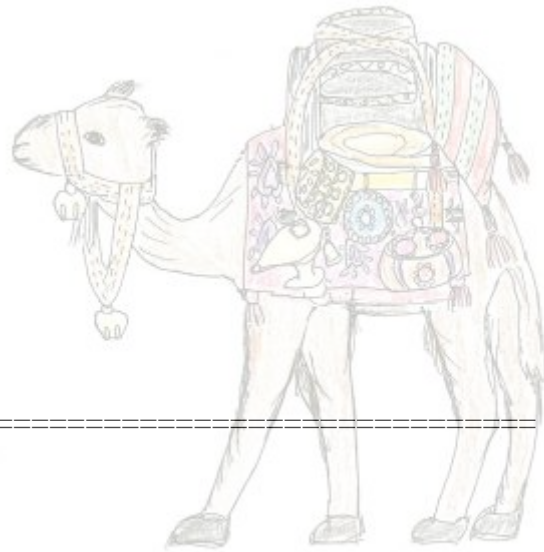
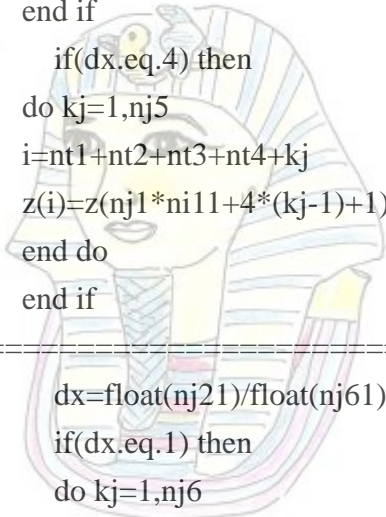


阿拉丁神燈

```

do kj=1,nj5
i=nt1+nt2+nt3+nt4+kj
z(i)=z(nj1*ni11+3*(kj-1)+1)
end do
end if
if(dx.eq.4) then
do kj=1,nj5
i=nt1+nt2+nt3+nt4+kj
z(i)=z(nj1*ni11+4*(kj-1)+1)
end do
end if

```



戴滿珠寶的駱駝

```

!=====
dx=float(nj21)/float(nj61)
if(dx.eq.1) then
do kj=1,nj6
i=nt1+nt2+nt3+nt4+nt5+kj
y(i)=y(kj)
end do
end if

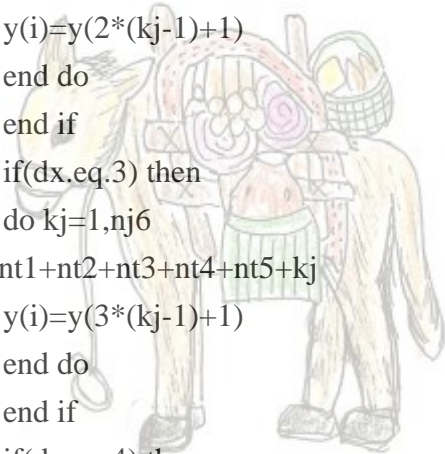
```

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```

if(dx.eq.2) then
do kj=1,nj6
i=nt1+nt2+nt3+nt4+nt5+kj
y(i)=y(2*(kj-1)+1)
end do
end if
if(dx.eq.3) then
do kj=1,nj6
i=nt1+nt2+nt3+nt4+nt5+kj
y(i)=y(3*(kj-1)+1)
end do
end if

```



阿拉丁神燈

```

if(dx.eq.4) then
do kj=1,nj6
i=nt1+nt2+nt3+nt4+nt5+kj
y(i)=y(4*(kj-1)+1)
end do
end if

```

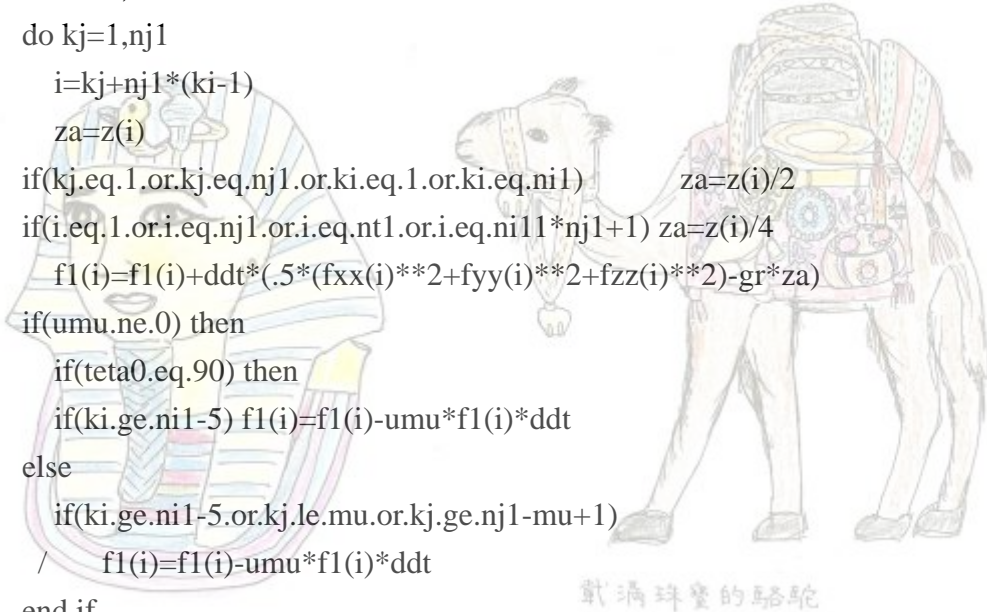
戴珠寶的馬廬子

!=====

```
call check_error(x,y,z,nt,f1,f1b,nt1,ni1,nj1,mas,eng,ek,ep)
```

```
!=====
```

```
do ki=1,ni1
do kj=1,nj1
  i=kj+nj1*(ki-1)
  za=z(i)
  if(kj.eq.1.or.kj.eq.nj1.or.ki.eq.1.or.ki.eq.ni1) za=z(i)/2
  if(i.eq.1.or.i.eq.nj1.or.i.eq.nt1.or.i.eq.ni1*nj1+1) za=z(i)/4
  f1(i)=f1(i)+ddt*(.5*(fxx(i)**2+fyy(i)**2+fzz(i)**2)-gr*za)
  if(umu.ne.0) then
    if(teta0.eq.90) then
      if(ki.ge.ni1-5) f1(i)=f1(i)-umu*f1(i)*ddt
    else
      if(ki.ge.ni1-5.or.kj.le.mu.or.kj.ge.nj1-mu+1)
        / f1(i)=f1(i)-umu*f1(i)*ddt
    end if
  end if
end do
end do
end do
```



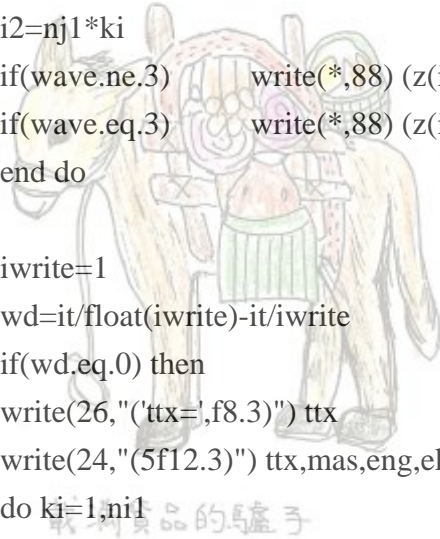
載滿珠寶的駱駝

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```
!=====
```

```
do ki=1,ni1
  i1=nj1*(ki-1)+1
  i2=nj1*ki
  if(wave.ne.3) write(*,88) (z(i)/(h31/2.), i=i1,i2)
  if(wave.eq.3) write(*,88) (z(i)/(h*depth),i=i1,i2)
end do

iwrite=1
wd=it/float(iwrite)-it/iwrite
if(wd.eq.0) then
  write(26,"('ttx=',f8.3)") ttx
  write(24,"(5f12.3)") ttx,mas,eng,ek,ep
do ki=1,ni1
  i1=nj1*(ki-1)+1
  i2=nj1*ki
  if(wave.ne.3) write(26,88) (z(i)/(h31/2.),i=i1,i2)
  if(wave.eq.3) write(26,88) (z(i)/(h*depth),i=i1,i2)
end do
```



載滿寶物的驢子



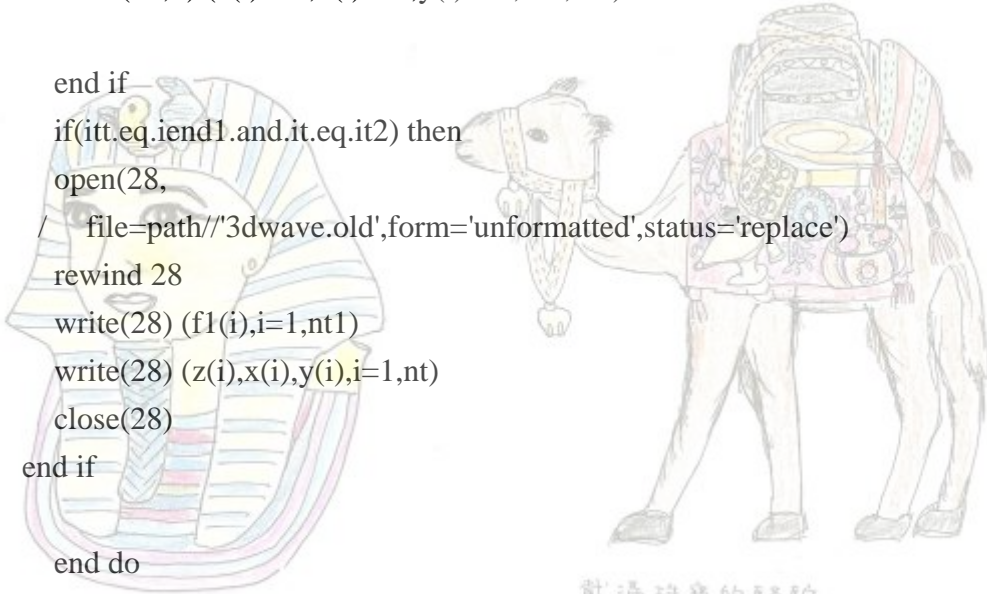
阿拉丁神燈

```

write(27, "('tx=',f8.3)") ttx
write(27,7) (z(i)*ho,x(i)*ho,y(i)*ho,i=1,nt1)

end if
if(itt.eq.iend1.and.it.eq.it2) then
open(28,
/ file=path/'3dwave.old',form='unformatted',status='replace')
rewind 28
write(28) (f1(i),i=1,nt1)
write(28) (z(i),x(i),y(i),i=1,nt)
close(28)
end if
end do
end do
close(27)

```



載滿珠寶的駱駝

!=====

```

7   format( 3f7.3)           2011 埃及尼羅河之旅
6   format(21f5.2)
5   format(8f16.8)
4   format(3f10.4)
3   format(3f10.4)
2   format(4f10.4)
10  format('  ill = ',i7)
11  format('  ill11 = ',i7)
89  format(21f8.4)
88  format(101f5.2)
!#####
!   stop  all nodes
    write(*,*) 'stop'
    do 9199 iy=1,7
9199 call mpi_send(99,1,mpi_integer,iy,1,mpi_comm_world,ierror)
    end if

```

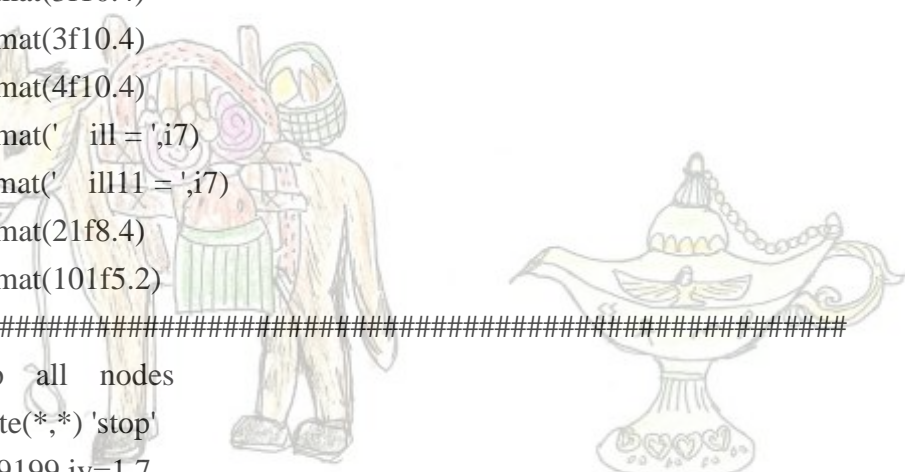
!

```

!   in processor 2 (n1,node1.cluster)
!   *****

```

!



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```

if(rank.eq.1)then
9201  c(2)=0
      call mpi_recv(c(2),1,mpi_integer,0,1,mpi_comm_world,stat,ierror)
      if(c(2).eq.99) goto 9299
      call openfileo(11,12,path)
      read(11) (z(i),x(i),y(i),i=1,nt)
      close(11)
! hh & gg (B12,B32)
      call solhh(hh,x,y,z,ni11,nj11,ni21,nj21,ni31,nj31,ni41,nj41,
&      ni51,nj51,ni61,nj61,nt,nt0,1,2,3,4,
&      nn1,nn2,nn3,nn4,83,84,212,ist1,jst2,-1,path)
      call solgg(gg,x,y,z,ni11,nj11,ni21,nj21,ni31,nj31,ni41,nj41,
&      ni51,nj51,ni61,nj61,nt,nt0,1,2,3,4,
&      nn1,nn2,nn3,nn4,83,84,112,ist1,jst2,-1,path)
      call solhh(hh,x,y,z,ni11,nj11,ni21,nj21,ni31,nj31,ni41,nj41,
&      ni51,nj51,ni61,nj61,nt,nt0,5,6,3,4,
&      nn5,nn6,nn3,nn4,83,84,232,ist3,jst2,-1,path)
      call solgg(gg,x,y,z,ni11,nj11,ni21,nj21,ni31,nj31,ni41,nj41,
&      ni51,nj51,ni61,nj61,nt,nt0,5,6,3,4,
&      nn5,nn6,nn3,nn4,83,84,132,ist3,jst2,-1,path)
      call mpi_send(1,1,mpi_integer,0,1,mpi_comm_world,ierror)
! B33^ (with n0)
      call mpi_recv(c(2),1,mpi_integer,0,12,mpi_comm_world,stat,ierror)
      call mir2_2(hh,gg,nt0,nn5,nn6,133,72,2,path)
      call mpi_send(3,1,mpi_integer,0,12,mpi_comm_world,ierror)
! B33^ *B34 (with n0)
      call mpi_recv(c(2),1,mpi_integer,0,12,mpi_comm_world,stat,ierror)
      call mtr2_2(hh,gg,nt0,nn5,nn6,nn5,nn6,nn7,nn8,
&      333,134,72,1,62,path)
      call mpi_send(3,1,mpi_integer,0,12,mpi_comm_world,ierror)
! B43 * [B33^ *B34] (with n0)
      call mpi_recv(c(2),1,mpi_integer,0,12,mpi_comm_world,stat,ierror)
      call mtr2_2(hh,gg,nt0,nn7,nn8,nn5,nn6,nn7,nn8,
&      143,334,72,1,62,path)
      call mpi_send(3,1,mpi_integer,0,12,mpi_comm_world,ierror)
! B44 - [B43 * B33^ *B34] (only n0)
! [B44 - B43 * B33^ *B34]^ (with n0)
      call mpi_recv(c(2),1,mpi_integer,0,12,mpi_comm_world,stat,ierror)

```



```

call mir2_2(hh,gg,nt0,nn7,nn8,344,72,2,path)
call mpi_send(3,1,mpi_integer,0,12,mpi_comm_world,ierror)
! [- B33^ *B34] * [B44 - B43 * B33^ *B34]^ (with n0)
call mpi_recv(c(2),1,mpi_integer,0,12,mpi_comm_world,stat,ierror)
call mtr2_2(hh,gg,nt0,nn5,nn6,nn7,nn8,nn7,nn8,
& 334,444,72,-1,62,path)
call mpi_send(3,1,mpi_integer,0,12,mpi_comm_world,ierror)
! A22^ * A21
call mpi_recv(c(2),1,mpi_integer,0,12,mpi_comm_world,stat,ierror)
call mtr4_2(hh,gg,nt0,nn5,nn6,nn7,nn8,nn5,nn6,nn7,nn8,nn1,nn2,nn3,
& nn4,433,434,443,444,131,132,141,142,
& 331,332,341,342,1,72,62,52,path)
call mpi_send(1,1,mpi_integer,0,12,mpi_comm_world,ierror)
! A12 * [A22^ * A21]
call mpi_recv(c(2),1,mpi_integer,0,12,mpi_comm_world,stat,ierror)
call mtr4_2(hh,gg,nt0,nn1,nn2,nn3,nn4,nn5,nn6,nn7,nn8,nn1,nn2,nn3,
& nn4,113,114,123,124,331,332,341,342,
& 511,512,521,522,1,72,62,52,path)
call mpi_send(1,1,mpi_integer,0,12,mpi_comm_world,ierror)
! A11 - A12 * [A22^ * A21]
call mpi_recv(c(2),1,mpi_integer,0,12,mpi_comm_world,stat,ierror)
call sa2(hh,gg,nt0,nn1,nn2,nn3,nn4,112,512,612,path)
call mpi_send(1,1,mpi_integer,0,12,mpi_comm_world,ierror)
! B11^ (with n0)
call mpi_recv(c(2),1,mpi_integer,0,12,mpi_comm_world,stat,ierror)
call mir2_2(hh,gg,nt0,nn1,nn2,611,72,2,path)
call mpi_send(3,1,mpi_integer,0,12,mpi_comm_world,ierror)
! B11^ *B12 (with n0)
call mpi_recv(c(2),1,mpi_integer,0,12,mpi_comm_world,stat,ierror)
call mtr2_2(hh,gg,nt0,nn1,nn2,nn1,nn2,nn3,nn4,
& 411,612,72,1,62,path)
call mpi_send(3,1,mpi_integer,0,12,mpi_comm_world,ierror)
! B21 * [B11^ *B12] (with n0)
call mpi_recv(c(2),1,mpi_integer,0,12,mpi_comm_world,stat,ierror)
call mtr2_2(hh,gg,nt0,nn3,nn4,nn1,nn2,nn3,nn4,
& 621,412,72,1,62,path)
call mpi_send(3,1,mpi_integer,0,12,mpi_comm_world,ierror)
! B22 - [B21 * B11^ *B12] (only n0)

```

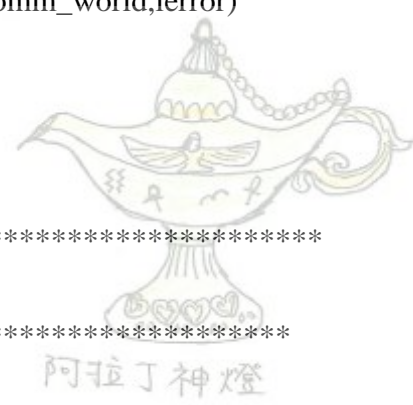
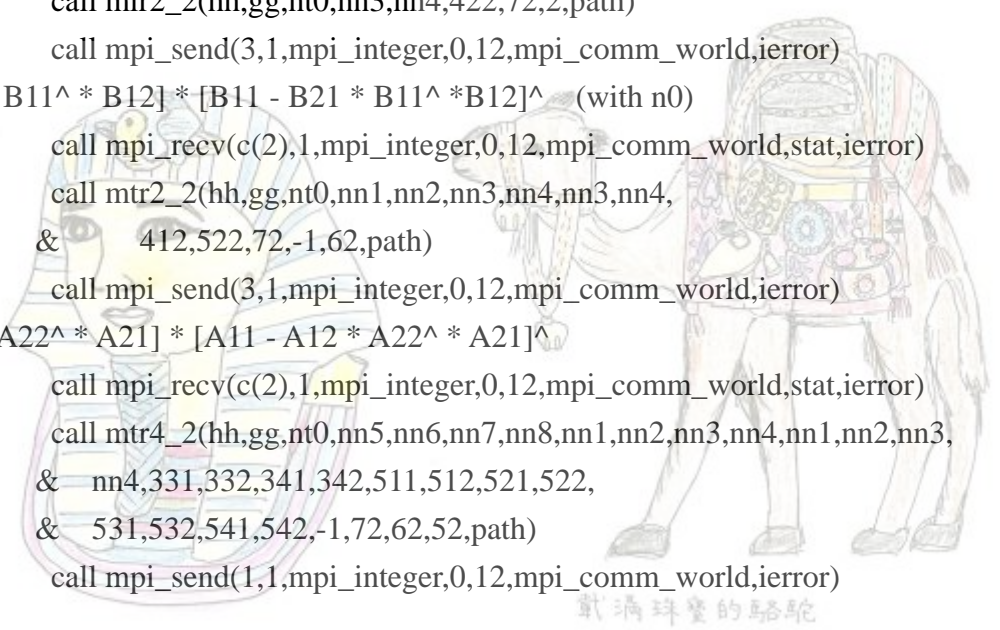
```

! [B22 - B21 * B11^ * B12]^ (with n0)
  call mpi_recv(c(2),1,mpi_integer,0,12,mpi_comm_world,stat,ierror)
  call mir2_2(hh,gg,nt0,nn3,nn4,422,72,2,path)
  call mpi_send(3,1,mpi_integer,0,12,mpi_comm_world,ierror)
! [- B11^ * B12] * [B11 - B21 * B11^ * B12]^ (with n0)
  call mpi_recv(c(2),1,mpi_integer,0,12,mpi_comm_world,stat,ierror)
  call mtr2_2(hh,gg,nt0,nn1,nn2,nn3,nn4,nn3,nn4,
& 412,522,72,-1,62,path)
  call mpi_send(3,1,mpi_integer,0,12,mpi_comm_world,ierror)
! [-A22^ * A21] * [A11 - A12 * A22^ * A21]^
  call mpi_recv(c(2),1,mpi_integer,0,12,mpi_comm_world,stat,ierror)
  call mtr4_2(hh,gg,nt0,nn5,nn6,nn7,nn8,nn1,nn2,nn3,nn4,nn1,nn2,nn3,
& nn4,331,332,341,342,511,512,521,522,
& 531,532,541,542,-1,72,62,52,path)
  call mpi_send(1,1,mpi_integer,0,12,mpi_comm_world,ierror)

  call mpi_recv(c(2),1,mpi_integer,0,1,mpi_comm_world,stat,ierror)
  call solf1b1(hh,f1,f1b,f2b,nt0,nt1,nt2,nn1,nn2,nn3,nn4,nn5,nn6,
& nn7,nn8,2,211,212,213,214,52,path)
  call mpi_send(1,1,mpi_integer,0,1,mpi_comm_world,ierror)

  call mpi_recv(c(2),1,mpi_integer,0,1,mpi_comm_world,stat,ierror)
  call solf1b2(hh,f1,f1b,nt0,nt1,nn1,nn2,nn3,nn4,nn5,nn6,
& nn7,nn8,2,511,512,513,514,51,62,path)
  call mpi_send(1,1,mpi_integer,0,1,mpi_comm_world,ierror)
  goto 9201
9299 continue
  end if
! *****
! in processor 3 (n2,node2.cluster)
! *****
  if(rank.eq.2)then
9301 c(3)=0
  call mpi_recv(c(3),1,mpi_integer,0,1,mpi_comm_world,stat,ierror)
  if(c(3).eq.99) goto 9399
  call openfileo(11,12,path)
  read(11) (z(i),x(i),y(i),i=1,nt)

```



```

close(11)
! hh & gg (B13,B33)
  call solhh(hh,x,y,z,ni11,nj11,ni21,nj21,ni31,nj31,ni41,nj41,
&    ni51,nj51,ni61,nj61,nt,nt0,1,2,5,6,
&    nn1,nn2,nn5,nn6,85,86,213,ist1,jst3,-1,path)
  call solgg(gg,x,y,z,ni11,nj11,ni21,nj21,ni31,nj31,ni41,nj41,
&    ni51,nj51,ni61,nj61,nt,nt0,1,2,5,6,
&    nn1,nn2,nn5,nn6,85,86,113,ist1,jst3,-1,path)
  call solhh(hh,x,y,z,ni11,nj11,ni21,nj21,ni31,nj31,ni41,nj41,
&    ni51,nj51,ni61,nj61,nt,nt0,5,6,5,6,
&    nn5,nn6,nn5,nn6,85,86,233,ist3,jst3,-1,path)
  call solgg(gg,x,y,z,ni11,nj11,ni21,nj21,ni31,nj31,ni41,nj41,
&    ni51,nj51,ni61,nj61,nt,nt0,5,6,5,6,
&    nn5,nn6,nn5,nn6,85,86,133,ist3,jst3,-1,path)
  call mpi_send(1,1,mpi_integer,0,1,mpi_comm_world,ierror)
! B44^ (with n3)
  call mpi_recv(c(3),1,mpi_integer,0,13,mpi_comm_world,stat,ierror)
  call mpi_send(7,1,mpi_integer,3,34,MPI_COMM_WORLD,IERROR)
  call mir2_1(hh,gg,nt0,nn7,nn8,144,73,3,path)
  call mpi_recv(c(3),1,mpi_integer,3,34,mpi_comm_world,stat,ierror)
  call mir2_3(hh,nt0,nn7,nn8,73,74,544,path)
! B44^ *B43 (with n3)
  call mpi_send(7,1,mpi_integer,3,34,mpi_comm_world,ierror)
  call mtr2_1(hh,gg,nt0,nn7,nn8,nn7,nn8,nn5,nn6,
&    544,143,73,1,63,path)
  call mpi_recv(c(3),1,mpi_integer,3,34,mpi_comm_world,stat,ierror)
  call mtr2_3(hh,nt0,nn7,nn8,nn5,nn6,73,74,543,path)
! B34 * [B44^ *B43] (with n3)
  call mpi_send(7,1,mpi_integer,3,34,mpi_comm_world,ierror)
  call mtr2_1(hh,gg,nt0,nn5,nn6,nn7,nn8,nn5,nn6,
&    134,543,73,1,63,path)
  call mpi_recv(c(2),1,mpi_integer,3,34,mpi_comm_world,stat,ierror)
  call mtr2_3(hh,nt0,nn5,nn6,nn5,nn6,73,74,633,path)
! B33 - [B34 * B44^ *B43] (only n2)
  call sa2(hh,gg,nt0,nn5,nn6,nn5,nn6,133,633,533,path)
! [B33 - B34 * B44^ *B43]^ (with n3)
  call mpi_send(7,1,mpi_integer,3,34,mpi_comm_world,ierror)
  call mir2_1(hh,gg,nt0,nn5,nn6,533,73,3,path)

```

```

call mpi_recv(c(3),1,mpi_integer,3,34,mpi_comm_world,stat,ierror)
call mir2_3(hh,nt0,nn5,nn6,73,74,433,path)
! [- B44^ * B43][B33 - B34 * B44^ * B43]^ (with n3)
call mpi_send(7,1,mpi_integer,3,34,mpi_comm_world,ierror)
call mtr2_1(hh,gg,nt0,nn7,nn8,nn5,nn6,nn5,nn6,
& 543,433,73,-1,63,path)
call mpi_recv(c(3),1,mpi_integer,3,34,mpi_comm_world,stat,ierror)
call mtr2_3(hh,nt0,nn7,nn8,nn5,nn6,73,74,443,path)
call mpi_send(1,1,mpi_integer,0,13,mpi_comm_world,ierror)
! A22^ * A21
call mpi_recv(c(3),1,mpi_integer,0,13,mpi_comm_world,stat,ierror)
call mtr4_3(hh,gg,nt0,nn5,nn6,nn7,nn8,nn5,nn6,nn7,nn8,nn1,nn2,nn3,
& nn4,433,434,443,444,131,132,141,142,
& 331,332,341,342,1,73,63,53,path)
call mpi_send(1,1,mpi_integer,0,13,mpi_comm_world,ierror)
! A12 * [A22^ * A21]
call mpi_recv(c(3),1,mpi_integer,0,13,mpi_comm_world,stat,ierror)
call mtr4_3(hh,gg,nt0,nn1,nn2,nn3,nn4,nn5,nn6,nn7,nn8,nn1,nn2,nn3,
& nn4,113,114,123,124,331,332,341,342,
& 511,512,521,522,1,73,63,53,path)
call mpi_send(1,1,mpi_integer,0,13,mpi_comm_world,ierror)
! A11 - A12 * [A22^ * A21]
call mpi_recv(c(3),1,mpi_integer,0,13,mpi_comm_world,stat,ierror)
call sa2(hh,gg,nt0,nn3,nn4,nn1,nn2,121,521,621,path)
call mpi_send(1,1,mpi_integer,0,13,mpi_comm_world,ierror)
! B22^ (with n3)
call mpi_recv(c(3),1,mpi_integer,0,13,mpi_comm_world,stat,ierror)
call mpi_send(7,1,mpi_integer,3,34,mpi_comm_world,ierror)
call mir2_1(hh,gg,nt0,nn3,nn4,622,73,3,path)
call mpi_recv(c(3),1,mpi_integer,3,34,mpi_comm_world,stat,ierror)
call mir2_3(hh,nt0,nn3,nn4,73,74,722,path)
! B22^ * B21 (with n3)
call mpi_send(7,1,mpi_integer,3,34,mpi_comm_world,ierror)
call mtr2_1(hh,gg,nt0,nn3,nn4,nn3,nn4,nn1,nn2,
& 722,621,73,1,63,path)
call mpi_recv(c(3),1,mpi_integer,3,34,mpi_comm_world,stat,ierror)
call mtr2_3(hh,nt0,nn3,nn4,nn1,nn2,73,74,721,path)
! B12 * [B22^ * B21] (with n3)

```

```

call mpi_send(7,1,mpi_integer,3,34,mpi_comm_world,ierror)
call mtr2_1(hh,gg,nt0,nn1,nn2,nn3,nn4,nn1,nn2,
& 612,721,73,1,63,path)
call mpi_recv(c(3),1,mpi_integer,3,34,mpi_comm_world,stat,ierror)
call mtr2_3(hh,nt0,nn1,nn2,nn1,nn2,73,74,811,path)
! B11 - [B12 * B22^ * B21] (only n2)
call sa2(hh,gg,nt0,nn1,nn2,nn1,nn2,611,811,711,path)
! [B11 - B12 * B22^ * B21]^ (with n3)
call mpi_send(7,1,mpi_integer,3,34,mpi_comm_world,ierror)
call mir2_1(hh,gg,nt0,nn1,nn2,711,73,3,path)
call mpi_recv(c(3),1,mpi_integer,3,34,mpi_comm_world,stat,ierror)
call mir2_3(hh,nt0,nn1,nn2,73,74,511,path)
! [- B22^ * B21][B11 - B12 * B22^ * B21]^ (with n3)
call mpi_send(7,1,mpi_integer,3,34,mpi_comm_world,ierror)
call mtr2_1(hh,gg,nt0,nn3,nn4,nn1,nn2,nn1,nn2,
& 721,511,73,-1,63,path)
call mpi_recv(c(3),1,mpi_integer,3,34,mpi_comm_world,stat,ierror)
call mtr2_3(hh,nt0,nn3,nn4,nn1,nn2,73,74,521,path)
call mpi_send(1,1,mpi_integer,0,13,mpi_comm_world,ierror)
! [-A22^ * A21] * [A11 - A12 * A22^ * A21]^
call mpi_recv(c(3),1,mpi_integer,0,13,mpi_comm_world,stat,ierror)
call mtr4_3(hh,gg,nt0,nn5,nn6,nn7,nn8,nn1,nn2,nn3,nn4,nn1,nn2,nn3,
& nn4,331,332,341,342,511,512,521,522,
& 531,532,541,542,-1,73,63,53,path)
call mpi_send(1,1,mpi_integer,0,13,mpi_comm_world,ierror)
call mpi_recv(c(3),1,mpi_integer,0,1,mpi_comm_world,stat,ierror)
call solf1b1(hh,f1,f1b,f2b,nt0,nt1,nt2,nn1,nn2,nn3,nn4,nn5,nn6,
& nn7,nn8,3,221,222,223,224,53,path)
call mpi_send(1,1,mpi_integer,0,1,mpi_comm_world,ierror)
call mpi_recv(c(3),1,mpi_integer,0,1,mpi_comm_world,stat,ierror)
call solf1b2(hh,f1,f1b,nt0,nt1,nn1,nn2,nn3,nn4,nn5,nn6,
& nn7,nn8,3,521,522,523,524,51,63,path)
call mpi_send(1,1,mpi_integer,0,1,mpi_comm_world,ierror)

```

goto 9301

9399 continue

```

end if
! *****
in processor 4 (n3,node3.cluster)
! *****
if(rank.eq.3)then
9401 c(4)=0
call mpi_recv(c(4),1,mpi_integer,0,1,mpi_comm_world,stat,ierror)
if(c(4).eq.99) goto 9499
call openfileo(11,12,path)
read(11) (z(i),x(i),y(i),i=1,nt)
close(11)
! hh & gg (B14,B34)
call solhh(hh,x,y,z,ni11,nj11,ni21,nj21,ni31,nj31,ni41,nj41,
& ni51,nj51,ni61,nj61,nt,nt0,1,2,7,8,
& nn1,nn2,nn7,nn8,87,88,114,ist1,jst4,1,path)
call solgg(gg,x,y,z,ni11,nj11,ni21,nj21,ni31,nj31,ni41,nj41,
& ni51,nj51,ni61,nj61,nt,nt0,1,2,7,8,
& nn1,nn2,nn7,nn8,87,88,214,ist1,jst4,1,path)
call solhh(hh,x,y,z,ni11,nj11,ni21,nj21,ni31,nj31,ni41,nj41,
& ni51,nj51,ni61,nj61,nt,nt0,5,6,7,8,
& nn5,nn6,nn7,nn8,87,88,134,ist3,jst4,1,path)
call solgg(gg,x,y,z,ni11,nj11,ni21,nj21,ni31,nj31,ni41,nj41,
& ni51,nj51,ni61,nj61,nt,nt0,5,6,7,8,
& nn5,nn6,nn7,nn8,87,88,234,ist3,jst4,1,path)
call mpi_send(1,1,mpi_integer,0,1,mpi_comm_world,ierror)
! B44^ (with n2)
call mpi_recv(c(4),1,mpi_integer,2,34,mpi_comm_world,stat,ierror)
call mir2_2(hh,gg,nt0,nn7,nn8,144,74,4,path)
call mpi_send(3,1,mpi_integer,2,34,mpi_comm_world,ierror)
! B44^ *B43 (with n2)
call mpi_recv(c(4),1,mpi_integer,2,34,mpi_comm_world,stat,ierror)
call mtr2_2(hh,gg,nt0,nn7,nn8,nn7,nn8,nn5,nn6,
& 544,143,74,1,64,path)
call mpi_send(3,1,mpi_integer,2,34,mpi_comm_world,ierror)
! B34 * [B44^ *B43] (with n2)
call mpi_recv(c(4),1,mpi_integer,2,34,mpi_comm_world,stat,ierror)
call mtr2_2(hh,gg,nt0,nn5,nn6,nn7,nn8,nn5,nn6,
& 134,543,74,1,64,path)

```

```

    call mpi_send(3,1,mpi_integer,2,34,mpi_comm_world,ierror)
! B33 - [B34 * B44^ *B43] (only n2)
! [B33 - B34 * B44^ *B43]^ (with n2)
    call mpi_recv(c(4),1,mpi_integer,2,34,mpi_comm_world,stat,ierror)
    call mir2_2(hh,gg,nt0,nn5,nn6,533,74,4,path)
    call mpi_send(3,1,mpi_integer,2,34,mpi_comm_world,ierror)
! [- B44^ *B43] * [B33 - B34 * B44^ *B43]^ (with n2)
    call mpi_recv(c(4),1,mpi_integer,2,34,mpi_comm_world,stat,ierror)
    call mtr2_2(hh,gg,nt0,nn7,nn8,nn5,nn6,nn5,nn6,
& 543,433,74,-1,64,path)
    call mpi_send(3,1,mpi_integer,2,34,mpi_comm_world,ierror)
! A22^ * A21
    call mpi_recv(c(4),1,mpi_integer,0,14,mpi_comm_world,stat,ierror)
    call mtr4_4(hh,gg,nt0,nn5,nn6,nn7,nn8,nn5,nn6,nn7,nn8,nn1,nn2,nn3,
& nn4,433,434,443,444,131,132,141,142,
& 331,332,341,342,1,74,64,54,path)
    call mpi_send(1,1,mpi_integer,0,14,mpi_comm_world,ierror)
! A12 * [A22^ * A21]
    call mpi_recv(c(4),1,mpi_integer,0,14,mpi_comm_world,stat,ierror)
    call mtr4_4(hh,gg,nt0,nn1,nn2,nn3,nn4,nn5,nn6,nn7,nn8,nn1,nn2,nn3,
& nn4,113,114,123,124,331,332,341,342,
& 511,512,521,522,1,74,64,54,path)
    call mpi_send(1,1,mpi_integer,0,14,mpi_comm_world,ierror)
! A11 - A12 * [A22^ * A21]
    call mpi_recv(c(4),1,mpi_integer,0,14,mpi_comm_world,stat,ierror)
    call sa2(hh,gg,nt0,nn3,nn4,nn3,nn4,122,522,622,path)
    call mpi_send(1,1,mpi_integer,0,14,mpi_comm_world,ierror)
! B22^ (with n2)
    call mpi_recv(c(4),1,mpi_integer,2,34,mpi_comm_world,stat,ierror)
    call mir2_2(hh,gg,nt0,nn3,nn4,622,74,4,path)
    call mpi_send(3,1,mpi_integer,2,34,mpi_comm_world,ierror)
! B22^ *B21 (with n2)
    call mpi_recv(c(4),1,mpi_integer,2,34,mpi_comm_world,stat,ierror)
    call mtr2_2(hh,gg,nt0,nn3,nn4,nn3,nn4,nn1,nn2,
& 722,621,74,1,64,path)
    call mpi_send(3,1,mpi_integer,2,34,mpi_comm_world,ierror)
! B12 * [B22^ *B21] (with n2)
    call mpi_recv(c(4),1,mpi_integer,2,34,mpi_comm_world,stat,ierror)

```

```

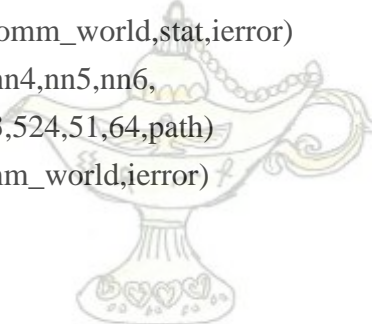
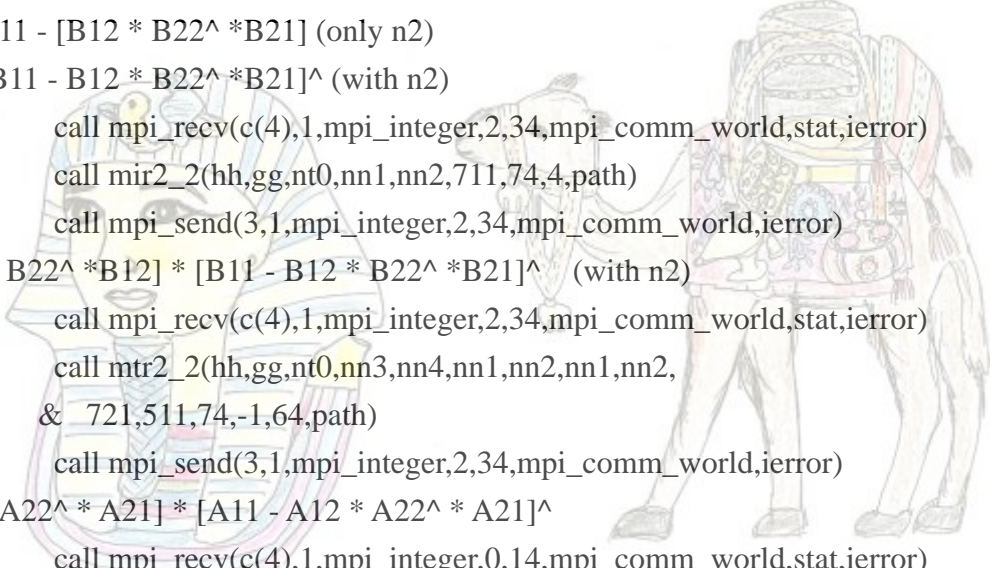
call mtr2_2(hh,gg,nt0,nn1,nn2,nn3,nn4,nn1,nn2,
& 612,721,74,1,64,path)
call mpi_send(3,1,mpi_integer,2,34,mpi_comm_world,ierror)
! B11 - [B12 * B22^ * B21] (only n2)
! [B11 - B12 * B22^ * B21]^ (with n2)
call mpi_recv(c(4),1,mpi_integer,2,34,mpi_comm_world,stat,ierror)
call mir2_2(hh,gg,nt0,nn1,nn2,711,74,4,path)
call mpi_send(3,1,mpi_integer,2,34,mpi_comm_world,ierror)
! [- B22^ * B12] * [B11 - B12 * B22^ * B21]^ (with n2)
call mpi_recv(c(4),1,mpi_integer,2,34,mpi_comm_world,stat,ierror)
call mtr2_2(hh,gg,nt0,nn3,nn4,nn1,nn2,nn1,nn2,
& 721,511,74,-1,64,path)
call mpi_send(3,1,mpi_integer,2,34,mpi_comm_world,ierror)
! [-A22^ * A21] * [A11 - A12 * A22^ * A21]^
call mpi_recv(c(4),1,mpi_integer,0,14,mpi_comm_world,stat,ierror)
call mtr4_4(hh,gg,nt0,nn5,nn6,nn7,nn8,nn1,nn2,nn3,nn4,nn1,nn2,nn3,
& nn4,331,332,341,342,511,512,521,522,
& 531,532,541,542,-1,74,64,54,path)
call mpi_send(1,1,mpi_integer,0,14,mpi_comm_world,ierror)

call mpi_recv(c(4),1,mpi_integer,0,1,mpi_comm_world,stat,ierror)
call solf1b1(hh,f1,f1b,f2b,nt0,nt1,nt2,nn1,nn2,nn3,nn4,nn5,nn6,
& nn7,nn8,4,221,222,223,224,54,path)
call mpi_send(1,1,mpi_integer,0,1,mpi_comm_world,ierror)

call mpi_recv(c(4),1,mpi_integer,0,1,mpi_comm_world,stat,ierror)
call solf1b2(hh,f1,f1b,nt0,nt1,nn1,nn2,nn3,nn4,nn5,nn6,
& nn7,nn8,4,521,522,523,524,51,64,path)
call mpi_send(1,1,mpi_integer,0,1,mpi_comm_world,ierror)

goto 9401
9499 continue
end if
! *****
! in processor 5 (n4,node4.cluster)
! *****
if(rank.eq.4)then
9501 c(5)=0

```



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```

call mpi_recv(c(5),1,mpi_integer,0,1,mpi_comm_world,stat,ierror)
if(c(5).eq.99) goto 9599
call openfileo(11,12,path)
read(11) (z(i),x(i),y(i),i=1,nt)
close(11)
! hh & gg (B21,B41)
call solhh(hh,x,y,z,ni11,nj11,ni21,nj21,ni31,nj31,ni41,nj41,
& ni51,nj51,ni61,nj61,nt,nt0,3,4,1,2,
& nn3,nn4,nn1,nn2,81,82,221,ist2,jst1,-1,path)
call solgg(gg,x,y,z,ni11,nj11,ni21,nj21,ni31,nj31,ni41,nj41,
& ni51,nj51,ni61,nj61,nt,nt0,3,4,1,2,
& nn3,nn4,nn1,nn2,81,82,121,ist2,jst1,-1,path)
call solhh(hh,x,y,z,ni11,nj11,ni21,nj21,ni31,nj31,ni41,nj41,
& ni51,nj51,ni61,nj61,nt,nt0,7,8,1,2,
& nn7,nn8,nn1,nn2,81,82,241,ist4,jst1,-1,path)
call solgg(gg,x,y,z,ni11,nj11,ni21,nj21,ni31,nj31,ni41,nj41,
& ni51,nj51,ni61,nj61,nt,nt0,7,8,1,2,
& nn7,nn8,nn1,nn2,81,82,141,ist4,jst1,-1,path)
call mpi_send(1,1,mpi_integer,0,1,mpi_comm_world,ierror)
! B11^ (with n5)
call mpi_recv(c(5),1,mpi_integer,0,15,mpi_comm_world,stat,ierror)
call mpi_send(9,1,mpi_integer,6,57,mpi_comm_world,ierror)
call mpi_send(7,1,mpi_integer,5,56,mpi_comm_world,ierror)
call mir2_1(hh,gg,nt0,nn1,nn2,111,75,5,path)
call mpi_recv(c(5),1,mpi_integer,5,56,mpi_comm_world,stat,ierror)
call mir2_3(hh,nt0,nn1,nn2,75,76,311,path)
! B11^ *B12 (with n5)
call mpi_send(7,1,mpi_integer,5,56,mpi_comm_world,ierror)
call mtr2_1(hh,gg,nt0,nn1,nn2,nn1,nn2,nn3,nn4,
& 311,112,75,1,65,path)
call mpi_recv(c(5),1,mpi_integer,5,56,mpi_comm_world,stat,ierror)
call mtr2_3(hh,nt0,nn1,nn2,nn3,nn4,75,76,312,path)
! B21 * [B11^ *B12] (with n5)
call mpi_send(7,1,mpi_integer,5,56,mpi_comm_world,ierror)
call mtr2_1(hh,gg,nt0,nn3,nn4,nn1,nn2,nn3,nn4,
& 121,312,75,1,65,path)
call mpi_recv(c(5),1,mpi_integer,5,56,mpi_comm_world,stat,ierror)
call mtr2_3(hh,nt0,nn3,nn4,nn3,nn4,75,76,422,path)

```

```

! B22 - [B21 * B11^ * B12] (only n4)
    call sa2(hh,gg,nt0,nn3,nn4,nn3,nn4,122,422,322,path)
! [B22 - B21 * B11^ * B12]^ (with n5)
    call mpi_send(7,1,mpi_integer,5,56,mpi_comm_world,ierror)
    call mir2_1(hh,gg,nt0,nn3,nn4,322,75,5,path)
    call mpi_recv(c(5),1,mpi_integer,5,56,mpi_comm_world,stat,ierror)
    call mir2_3(hh,nt0,nn3,nn4,75,76,422,path)
! [- B11^ * B12][B22 - B21 * B11^ * B12]^ (with n5)
    call mpi_send(7,1,mpi_integer,5,56,mpi_comm_world,ierror)
    call mtr2_1(hh,gg,nt0,nn1,nn2,nn3,nn4,nn3,nn4,
& 312,422,75,-1,65,path)
    call mpi_recv(c(5),1,mpi_integer,5,56,mpi_comm_world,stat,ierror)
    call mtr2_3(hh,nt0,nn1,nn2,nn3,nn4,75,76,412,path)
    call mpi_recv(c(7),1,mpi_integer,6,57,mpi_comm_world,stat,ierror)
! sol. A11^ * A12
    call mpi_send(9,1,mpi_integer,5,56,mpi_comm_world,ierror)
    call mpi_send(9,1,mpi_integer,6,57,mpi_comm_world,ierror)
    call mpi_send(9,1,mpi_integer,7,58,mpi_comm_world,ierror)
    call mtr4_1(hh,gg,nt0,nn1,nn2,nn3,nn4,nn1,nn2,nn3,nn4,nn5,nn6,nn7,
& nn8,411,412,421,422,113,114,123,124,
& 313,314,323,324,1,75,65,55,path)
    call mpi_recv(c(6),1,mpi_integer,5,56,mpi_comm_world,stat,ierror)
    call mpi_recv(c(7),1,mpi_integer,6,57,mpi_comm_world,stat,ierror)
    call mpi_recv(c(8),1,mpi_integer,7,58,mpi_comm_world,stat,ierror)
! A21 * [A11^ * A12]
    call mpi_send(9,1,mpi_integer,5,56,mpi_comm_world,ierror)
    call mpi_send(9,1,mpi_integer,6,57,mpi_comm_world,ierror)
    call mpi_send(9,1,mpi_integer,7,58,mpi_comm_world,ierror)
    call mtr4_1(hh,gg,nt0,nn5,nn6,nn7,nn8,nn1,nn2,nn3,nn4,nn5,nn6,nn7,
& nn8,131,132,141,142,313,314,323,324,
& 533,534,543,544,1,75,65,55,path)
    call mpi_recv(c(6),1,mpi_integer,5,56,mpi_comm_world,stat,ierror)
    call mpi_recv(c(7),1,mpi_integer,6,57,mpi_comm_world,stat,ierror)
    call mpi_recv(c(8),1,mpi_integer,7,58,mpi_comm_world,stat,ierror)
! A22 - A21 * [A11^ * A12]
    call mpi_send(9,1,mpi_integer,5,56,mpi_comm_world,ierror)
    call mpi_send(9,1,mpi_integer,6,57,mpi_comm_world,ierror)
    call mpi_send(9,1,mpi_integer,7,58,mpi_comm_world,ierror)

```

```

call sa2(hh,gg,nt0,nn5,nn6,nn5,nn6,133,533,633,path)
call mpi_recv(c(6),1,mpi_integer,5,56,mpi_comm_world,stat,ierror)
call mpi_recv(c(7),1,mpi_integer,6,57,mpi_comm_world,stat,ierror)
call mpi_recv(c(8),1,mpi_integer,7,58,mpi_comm_world,stat,ierror)
! B33^ (with n5)
call mpi_send(9,1,mpi_integer,6,57,mpi_comm_world,ierror)
call mpi_send(7,1,mpi_integer,5,56,mpi_comm_world,ierror)
call mir2_1(hh,gg,nt0,nn5,nn6,633,75,5,path)
call mpi_recv(c(5),1,mpi_integer,5,56,mpi_comm_world,stat,ierror)
call mir2_3(hh,nt0,nn5,nn6,75,76,433,path)
! B33^ *B34 (with n5)
call mpi_send(7,1,mpi_integer,5,56,mpi_comm_world,ierror)
call mtr2_1(hh,gg,nt0,nn5,nn6,nn5,nn6,nn7,nn8,
& 433,634,75,1,65,path)
call mpi_recv(c(5),1,mpi_integer,5,56,mpi_comm_world,stat,ierror)
call mtr2_3(hh,nt0,nn5,nn6,nn7,nn8,75,76,434,path)
! B43 * [B33^ *B34] (with n5)
call mpi_send(7,1,mpi_integer,5,56,mpi_comm_world,ierror)
call mtr2_1(hh,gg,nt0,nn7,nn8,nn5,nn6,nn7,nn8,
& 643,434,75,1,65,path)
call mpi_recv(c(5),1,mpi_integer,5,56,mpi_comm_world,stat,ierror)
call mtr2_3(hh,nt0,nn7,nn8,nn7,nn8,75,76,544,path)
! B44 - [B43 * B33^ *B34] (only n4)
call sa2(hh,gg,nt0,nn7,nn8,nn7,nn8,644,544,444,path)
! [B44 - B43 * B33^ *B34]^ (with n5)
call mpi_send(7,1,mpi_integer,5,56,mpi_comm_world,ierror)
call mir2_1(hh,gg,nt0,nn7,nn8,444,75,5,path)
call mpi_recv(c(5),1,mpi_integer,5,56,mpi_comm_world,stat,ierror)
call mir2_3(hh,nt0,nn7,nn8,75,76,544,path)
! [- B33^ * B34][B44 - B43 * B33^ * B34]^ (with n5)
call mpi_send(7,1,mpi_integer,5,56,mpi_comm_world,ierror)
call mtr2_1(hh,gg,nt0,nn5,nn6,nn7,nn8,nn7,nn8,
& 434,544,75,-1,65,path)
call mpi_recv(c(5),1,mpi_integer,5,56,mpi_comm_world,stat,ierror)
call mtr2_3(hh,nt0,nn5,nn6,nn7,nn8,75,76,534,path)
call mpi_recv(c(7),1,mpi_integer,6,57,mpi_comm_world,stat,ierror)
! [-A11^ * A12] * [A22 - A21 * A11^ * A12]^
call mpi_send(9,1,mpi_integer,5,56,mpi_comm_world,ierror)

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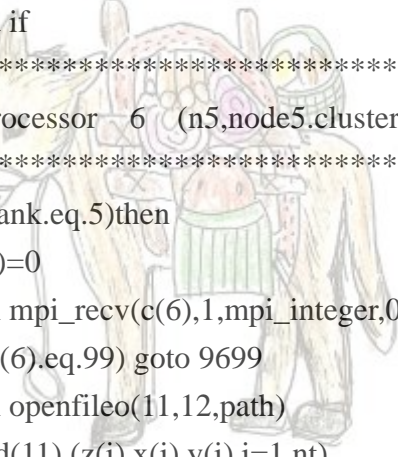
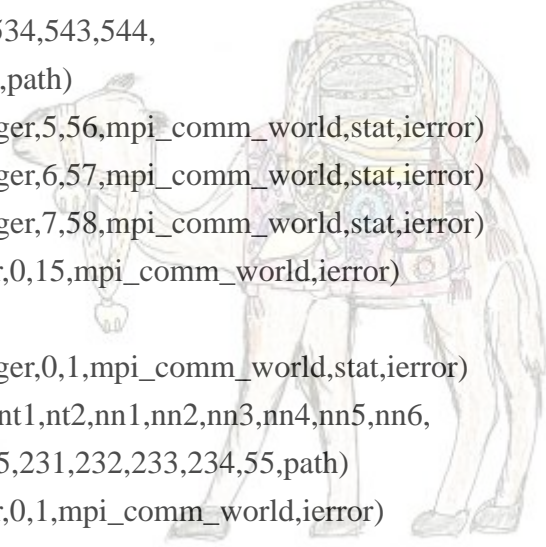
call mpi_send(9,1,mpi_integer,6,57,mpi_comm_world,ierror)
call mpi_send(9,1,mpi_integer,7,58,mpi_comm_world,ierror)
call mtr4_1(hh,gg,nt0,nn1,nn2,nn3,nn4,nn5,nn6,nn7,nn8,nn5,nn6,nn7,
& nn8,313,314,323,324,533,534,543,544,
& 513,514,523,524,-1,75,65,55,path)
call mpi_recv(c(6),1,mpi_integer,5,56,mpi_comm_world,stat,ierror)
call mpi_recv(c(7),1,mpi_integer,6,57,mpi_comm_world,stat,ierror)
call mpi_recv(c(8),1,mpi_integer,7,58,mpi_comm_world,stat,ierror)
call mpi_send(1,1,mpi_integer,0,15,mpi_comm_world,ierror)

call mpi_recv(c(5),1,mpi_integer,0,1,mpi_comm_world,stat,ierror)
call solf1b1(hh,f1,f1b,f2b,nt0,nt1,nt2,nn1,nn2,nn3,nn4,nn5,nn6,
& nn7,nn8,5,231,232,233,234,55,path)
call mpi_send(1,1,mpi_integer,0,1,mpi_comm_world,ierror)

call mpi_recv(c(5),1,mpi_integer,0,1,mpi_comm_world,stat,ierror)
call solf1b2(hh,f1,f1b,nt0,nt1,nn1,nn2,nn3,nn4,nn5,nn6,
& nn7,nn8,5,531,532,533,534,51,65,path)
call mpi_send(1,1,mpi_integer,0,1,mpi_comm_world,ierror)

goto 9501
9599 continue
end if
! *****
! in processor 6 (n5,node5.cluster)
! *****
if(rank.eq.5)then
9601 c(6)=0
call mpi_recv(c(6),1,mpi_integer,0,1,mpi_comm_world,stat,ierror)
if(c(6).eq.99) goto 9699
call openfileo(11,12,path)
read(11) (z(i),x(i),y(i),i=1,nt)
close(11)
! hh & gg (B22,B42)
call solhh(hh,x,y,z,ni11,nj11,ni21,nj21,ni31,nj31,ni41,nj41,
& ni51,nj51,ni61,nj61,nt,nt0,3,4,3,4,
& nn3,nn4,nn3,nn4,83,84,222,ist2,jst2,-1,path)
call solgg(gg,x,y,z,ni11,nj11,ni21,nj21,ni31,nj31,ni41,nj41,

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&    ni51,nj51,ni61,nj61,nt,nt0,3,4,3,4,
&    nn3,nn4,nn3,nn4,83,84,122,ist2,jst2,-1,path)
  call solhh(hh,x,y,z,ni11,nj11,ni21,nj21,ni31,nj31,ni41,nj41,
&    ni51,nj51,ni61,nj61,nt,nt0,7,8,3,4,
&    nn7,nn8,nn3,nn4,83,84,242,ist4,jst2,-1,path)
  call solgg(gg,x,y,z,ni11,nj11,ni21,nj21,ni31,nj31,ni41,nj41,
&    ni51,nj51,ni61,nj61,nt,nt0,7,8,3,4,
&    nn7,nn8,nn3,nn4,83,84,142,ist4,jst2,-1,path)
  call mpi_send(1,1,mpi_integer,0,1,mpi_comm_world,ierror)
! B11^ (with n4)
  call mpi_recv(c(6),1,mpi_integer,4,56,mpi_comm_world,stat,ierror)
  call mir2_2(hh,gg,nt0,nn1,nn2,111,76,6,path)
  call mpi_send(3,1,mpi_integer,4,56,mpi_comm_world,ierror)
! B11^ *B12 (with n4)
  call mpi_recv(c(6),1,mpi_integer,4,56,mpi_comm_world,stat,ierror)
  call mtr2_2(hh,gg,nt0,nn1,nn2,nn1,nn2,nn3,nn4,
&    311,112,76,1,66,path)
  call mpi_send(3,1,mpi_integer,4,56,mpi_comm_world,ierror)
! B21 * [B11^ *B12] (with n4) 2011 埃及尼羅河之旅
  call mpi_recv(c(6),1,mpi_integer,4,56,mpi_comm_world,stat,ierror)
  call mtr2_2(hh,gg,nt0,nn3,nn4,nn1,nn2,nn3,nn4,
&    121,312,76,1,66,path)
  call mpi_send(3,1,mpi_integer,4,56,mpi_comm_world,ierror)
! B22 - [B21 * B11^ *B12] (only n4)
! [B22 - B21 * B11^ *B12]^ (with n4)
  call mpi_recv(c(6),1,mpi_integer,4,56,mpi_comm_world,stat,ierror)
  call mir2_2(hh,gg,nt0,nn3,nn4,322,76,6,path)
  call mpi_send(3,1,mpi_integer,4,56,mpi_comm_world,ierror)
! [- B11^ *B12] * [B22 - B21 * B11^ *B12]^ (with n4)
  call mpi_recv(c(6),1,mpi_integer,4,56,mpi_comm_world,stat,ierror)
  call mtr2_2(hh,gg,nt0,nn1,nn2,nn3,nn4,nn3,nn4,
&    312,422,76,-1,66,path)
  call mpi_send(1,1,mpi_integer,4,56,mpi_comm_world,ierror)
! sol. A11^ * A12
  call mpi_recv(c(6),1,mpi_integer,4,56,mpi_comm_world,stat,ierror)
  call mtr4_2(hh,gg,nt0,nn1,nn2,nn3,nn4,nn1,nn2,nn3,nn4,nn5,nn6,nn7,
&    nn8,411,412,421,422,113,114,123,124,
&    313,314,323,324,1,76,66,56,path)

```

```

call mpi_send(1,1,mpi_integer,4,56,mpi_comm_world,ierror)
! A21 * [A11^ * A12]
call mpi_recv(c(6),1,mpi_integer,4,56,mpi_comm_world,stat,ierror)
call mtr4_2(hh,gg,nt0,nn5,nn6,nn7,nn8,nn1,nn2,nn3,nn4,nn5,nn6,nn7,
& nn8,131,132,141,142,313,314,323,324,
& 533,534,543,544,1,76,66,56,path)
call mpi_send(1,1,mpi_integer,4,56,mpi_comm_world,ierror)
! A22 - A21 * [A11^ * A12]
call mpi_recv(c(6),1,mpi_integer,4,56,mpi_comm_world,stat,ierror)
call sa2(hh,gg,nt0,nn5,nn6,nn7,nn8,134,534,634,path)
call mpi_send(1,1,mpi_integer,4,56,mpi_comm_world,ierror)
! B33^ (with n4)
call mpi_recv(c(6),1,mpi_integer,4,56,mpi_comm_world,stat,ierror)
call mir2_2(hh,gg,nt0,nn5,nn6,633,76,6,path)
call mpi_send(3,1,mpi_integer,4,56,mpi_comm_world,ierror)
! B33^ *B34 (with n4)
call mpi_recv(c(6),1,mpi_integer,4,56,mpi_comm_world,stat,ierror)
call mtr2_2(hh,gg,nt0,nn5,nn6,nn5,nn6,nn7,nn8,
& 433,634,76,1,66,path)2011 埃及尼羅河之旅
call mpi_send(3,1,mpi_integer,4,56,mpi_comm_world,ierror)
! B43 * [B33^ *B34] (with n4)
call mpi_recv(c(6),1,mpi_integer,4,56,mpi_comm_world,stat,ierror)
call mtr2_2(hh,gg,nt0,nn7,nn8,nn5,nn6,nn7,nn8,
& 643,434,76,1,66,path)
call mpi_send(3,1,mpi_integer,4,56,mpi_comm_world,ierror)
! B44 - [B43 * B33^ *B34] (only n4)
! [B44 - B43 * B33^ *B34]^ (with n4)
call mpi_recv(c(6),1,mpi_integer,4,56,mpi_comm_world,stat,ierror)
call mir2_2(hh,gg,nt0,nn7,nn8,444,76,6,path)
call mpi_send(3,1,mpi_integer,4,56,mpi_comm_world,ierror)
! [- B33^ *B34] * [B44 - B43 * B33^ *B34]^ (with n4)
call mpi_recv(c(6),1,mpi_integer,4,56,mpi_comm_world,stat,ierror)
call mtr2_2(hh,gg,nt0,nn5,nn6,nn7,nn8,nn7,nn8,
& 434,544,76,-1,66,path)
call mpi_send(3,1,mpi_integer,4,56,mpi_comm_world,ierror)
! [-A11^ * A12] * [A22 - A21 * A11^ * A12]^
call mpi_recv(c(6),1,mpi_integer,4,56,mpi_comm_world,stat,ierror)
call mtr4_2(hh,gg,nt0,nn1,nn2,nn3,nn4,nn5,nn6,nn7,nn8,nn5,nn6,nn7,

```

```

& nn8,313,314,323,324,533,534,543,544,
& 513,514,523,524,-1,76,66,56,path)
call mpi_send(1,1,mpi_integer,4,56,mpi_comm_world,ierror)

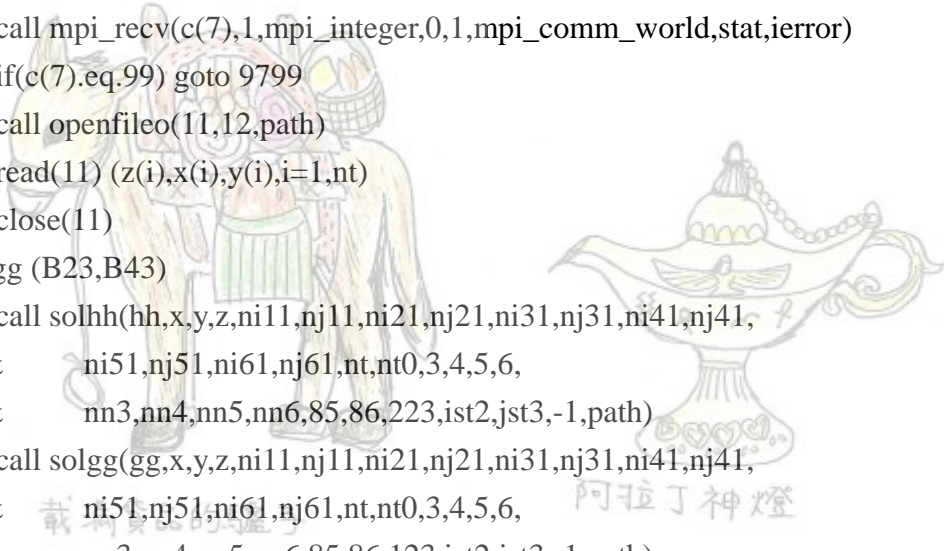
call mpi_recv(c(6),1,mpi_integer,0,1,mpi_comm_world,stat,ierror)
call solf1b1(hh,f1,f1b,f2b,nt0,nt1,nt2,nn1,nn2,nn3,nn4,nn5,nn6,
& nn7,nn8,6,231,232,233,234,56,path)
call mpi_send(1,1,mpi_integer,0,1,mpi_comm_world,ierror)

call mpi_recv(c(6),1,mpi_integer,0,1,mpi_comm_world,stat,ierror)
call solf1b2(hh,f1,f1b,nt0,nt1,nn1,nn2,nn3,nn4,nn5,nn6,
& nn7,nn8,6,531,532,533,534,51,66,path)
call mpi_send(1,1,mpi_integer,0,1,mpi_comm_world,ierror)

goto 9601
9699 continue
end if
! *****
in processor 7 (n6,node6.cluster) 尼羅河之旅
! *****

if(rank.eq.6)then
9701 c(7)=0
call mpi_recv(c(7),1,mpi_integer,0,1,mpi_comm_world,stat,ierror)
if(c(7).eq.99) goto 9799
call openfileo(11,12,path)
read(11) (z(i),x(i),y(i),i=1,nt)
close(11)
! hh & gg (B23,B43)
call solhh(hh,x,y,z,ni11,nj11,ni21,nj21,ni31,nj31,ni41,nj41,
& ni51,nj51,ni61,nj61,nt,nt0,3,4,5,6,
& nn3,nn4,nn5,nn6,85,86,223,ist2,jst3,-1,path)
call solgg(gg,x,y,z,ni11,nj11,ni21,nj21,ni31,nj31,ni41,nj41,
& ni51,nj51,ni61,nj61,nt,nt0,3,4,5,6,
& nn3,nn4,nn5,nn6,85,86,123,ist2,jst3,-1,path)
call solhh(hh,x,y,z,ni11,nj11,ni21,nj21,ni31,nj31,ni41,nj41,
& ni51,nj51,ni61,nj61,nt,nt0,7,8,5,6,
& nn7,nn8,nn5,nn6,85,86,243,ist4,jst3,-1,path)
call solgg(gg,x,y,z,ni11,nj11,ni21,nj21,ni31,nj31,ni41,nj41,

```



```

&    ni51,nj51,ni61,nj61,nt,nt0,7,8,5,6,
&    nn7,nn8,nn5,nn6,85,86,143,ist4,jst3,-1,path)
    call mpi_send(1,1,mpi_integer,0,1,mpi_comm_world,ierror)
! B22^ (with n7)
    call mpi_recv(c(7),1,mpi_integer,4,57,mpi_comm_world,stat,ierror)
    call mpi_send(7,1,mpi_integer,7,78,mpi_comm_world,ierror)
    call mir2_1(hh,gg,nt0,nn3,nn4,122,77,7,path)
    call mpi_recv(c(7),1,mpi_integer,7,78,mpi_comm_world,stat,ierror)
    call mir2_3(hh,nt0,nn3,nn4,77,78,522,path)
! B22^*B21 (with n7)
    call mpi_send(7,1,mpi_integer,7,78,mpi_comm_world,ierror)
    call mtr2_1(hh,gg,nt0,nn3,nn4,nn3,nn4,nn1,nn2,
& -522,121,77,1,67,path)
    call mpi_recv(c(7),1,mpi_integer,7,78,mpi_comm_world,stat,ierror)
    call mtr2_3(hh,nt0,nn3,nn4,nn1,nn2,77,78,521,path)
! B12 * [B22^*B21] (with n7)
    call mpi_send(7,1,mpi_integer,7,78,mpi_comm_world,ierror)
    call mtr2_1(hh,gg,nt0,nn1,nn2,nn3,nn4,nn1,nn2,
& 112,521,77,1,67,path)
    call mpi_recv(c(7),1,mpi_integer,7,78,mpi_comm_world,stat,ierror)
    call mtr2_3(hh,nt0,nn1,nn2,nn1,nn2,77,78,611,path)
! B11 - [B12 * B22^*B21] (only n6)
    call sa2(hh,gg,nt0,nn1,nn2,nn1,nn2,111,611,511,path)
! [B11 - B12 * B22^*B21]^ (with n7)
    call mpi_send(7,1,mpi_integer,7,78,mpi_comm_world,ierror)
    call mir2_1(hh,gg,nt0,nn1,nn2,511,77,7,path)
    call mpi_recv(c(7),1,mpi_integer,7,78,mpi_comm_world,stat,ierror)
    call mir2_3(hh,nt0,nn1,nn2,77,78,411,path)
! [- B22^* B21][B11 - B12 * B22^* B21]^ (with n7)
    call mpi_send(7,1,mpi_integer,7,78,mpi_comm_world,ierror)
    call mtr2_1(hh,gg,nt0,nn3,nn4,nn1,nn2,nn1,nn2,
& 521,411,77,-1,67,path)
    call mpi_recv(c(7),1,mpi_integer,7,78,mpi_comm_world,stat,ierror)
    call mtr2_3(hh,nt0,nn3,nn4,nn1,nn2,77,78,421,path)
    call mpi_send(1,1,mpi_integer,4,57,mpi_comm_world,ierror)
! sol. A11^* A12
    call mpi_recv(c(7),1,mpi_integer,4,57,mpi_comm_world,stat,ierror)
    call mtr4_3(hh,gg,nt0,nn1,nn2,nn3,nn4,nn1,nn2,nn3,nn4,nn5,nn6,nn7,

```



```

& nn8,411,412,421,422,113,114,123,124,313,314,
& 323,324,1,77,67,57,path)
call mpi_send(1,1,mpi_integer,4,57,mpi_comm_world,ierror)
! A21 * [A11^ * A12]
call mpi_recv(c(7),1,mpi_integer,4,57,mpi_comm_world,stat,ierror)
call mtr4_3(hh,gg,nt0,nn5,nn6,nn7,nn8,nn1,nn2,nn3,nn4,nn5,nn6,nn7,
& nn8,131,132,141,142,313,314,323,324,
& 533,534,543,544,1,77,67,57,path)
call mpi_send(1,1,mpi_integer,4,57,mpi_comm_world,ierror)
! A22 - A21 * [A11^ * A12]
call mpi_recv(c(7),1,mpi_integer,4,57,mpi_comm_world,stat,ierror)
call sa2(hh,gg,nt0,nn7,nn8,nn5,nn6,143,543,643,path)
call mpi_send(1,1,mpi_integer,4,57,mpi_comm_world,ierror)
! B44^ (with n7)
call mpi_recv(c(7),1,mpi_integer,4,57,mpi_comm_world,stat,ierror)
call mpi_send(7,1,mpi_integer,7,78,mpi_comm_world,ierror)
call mir2_1(hh,gg,nt0,nn7,nn8,644,77,7,path)
call mpi_recv(c(7),1,mpi_integer,7,78,mpi_comm_world,stat,ierror)
call mir2_3(hh,nt0,nn7,nn8,77,78,744,path)
! B44^ * B43 (with n7)
call mpi_send(7,1,mpi_integer,7,78,mpi_comm_world,ierror)
call mtr2_1(hh,gg,nt0,nn7,nn8,nn7,nn8,nn5,nn6,
& 744,643,77,1,67,path)
call mpi_recv(c(7),1,mpi_integer,7,78,mpi_comm_world,stat,ierror)
call mtr2_3(hh,nt0,nn7,nn8,nn5,nn6,77,78,743,path)
! B34 * [B44^ * B43] (with n7)
call mpi_send(7,1,mpi_integer,7,78,mpi_comm_world,ierror)
call mtr2_1(hh,gg,nt0,nn5,nn6,nn7,nn8,nn5,nn6,
& 634,743,77,1,67,path)
call mpi_recv(c(7),1,mpi_integer,7,78,mpi_comm_world,stat,ierror)
call mtr2_3(hh,nt0,nn5,nn6,nn5,nn6,77,78,833,path)
! B33 - [B34 * B44^ * B43] (only n6)
call sa2(hh,gg,nt0,nn5,nn6,nn5,nn6,633,833,733,path)
! [B33 - B34 * B44^ * B43]^ (with n7)
call mpi_send(7,1,mpi_integer,7,78,mpi_comm_world,ierror)
call mir2_1(hh,gg,nt0,nn5,nn6,733,77,7,path)
call mpi_recv(c(7),1,mpi_integer,7,78,mpi_comm_world,stat,ierror)
call mir2_3(hh,nt0,nn5,nn6,77,78,533,path)

```

```

! [- B44^ * B43][B33 - B34 * B44^ * B43]^ (with n7)
  call mpi_send(7,1,mpi_integer,7,78,mpi_comm_world,ierror)
  call mtr2_1(hh,gg,nt0,nn7,nn8,nn5,nn6,nn5,nn6,
& 743,533,77,-1,67,path)
  call mpi_recv(c(7),1,mpi_integer,7,78,mpi_comm_world,stat,ierror)
  call mtr2_3(hh,nt0,nn7,nn8,nn5,nn6,77,78,543,path)
  call mpi_send(1,1,mpi_integer,4,57,mpi_comm_world,ierror)
! [-A11^ * A12] * [A22 - A21 * A11^ * A12]^
  call mpi_recv(c(7),1,mpi_integer,4,57,mpi_comm_world,stat,ierror)
  call mtr4_3(hh,gg,nt0,nn1,nn2,nn3,nn4,nn5,nn6,nn7,nn8,nn5,nn6,nn7,
& nn8,313,314,323,324,533,534,543,544,513,514,
& 523,524,-1,77,67,57,path)
  call mpi_send(1,1,mpi_integer,4,57,mpi_comm_world,ierror)
  call mpi_recv(c(7),1,mpi_integer,0,1,mpi_comm_world,stat,ierror)
  call solf1b1(hh,f1,f1b,f2b,nt0,nt1,nt2,nn1,nn2,nn3,nn4,nn5,nn6,
&
& nn7,nn8,7,241,242,243,244,57,path)
  call mpi_send(1,1,mpi_integer,0,1,mpi_comm_world,ierror)
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  call mpi_recv(c(7),1,mpi_integer,0,1,mpi_comm_world,stat,ierror)
  call solf1b2(hh,f1,f1b,nt0,nt1,nn1,nn2,nn3,nn4,nn5,nn6,
&
& nn7,nn8,7,541,542,543,544,51,67,path)
  call mpi_send(1,1,mpi_integer,0,1,mpi_comm_world,ierror)
  goto 9701
9799 continue
  end if
! *****
! in processor 8 (n7,node7.cluster)
! *****
  if(rank.eq.7)then
9801 c(8)=0
  call mpi_recv(c(8),1,mpi_integer,0,1,mpi_comm_world,stat,ierror)
  if(c(8).eq.99) goto 9899
  call openfileo(11,12,path)
  read(11) (z(i),x(i),y(i),i=1,nt)
  close(11)
! hh & gg (B24,B44)

```

```

call solhh(hh,x,y,z,ni11,nj11,ni21,nj21,ni31,nj31,ni41,nj41,
& ni51,nj51,ni61,nj61,nt,nt0,3,4,7,8,
& nn3,nn4,nn7,nn8,87,88,124,ist2,jst4,1,path)
call solgg(gg,x,y,z,ni11,nj11,ni21,nj21,ni31,nj31,ni41,nj41,
& ni51,nj51,ni61,nj61,nt,nt0,3,4,7,8,
& nn3,nn4,nn7,nn8,87,88,224,ist2,jst4,1,path)
call solhh(hh,x,y,z,ni11,nj11,ni21,nj21,ni31,nj31,ni41,nj41,
& ni51,nj51,ni61,nj61,nt,nt0,7,8,7,8,
& nn7,nn8,nn7,nn8,87,88,144,ist4,jst4,1,path)
call solgg(gg,x,y,z,ni11,nj11,ni21,nj21,ni31,nj31,ni41,nj41,
& ni51,nj51,ni61,nj61,nt,nt0,7,8,7,8,
& nn7,nn8,nn7,nn8,87,88,244,ist4,jst4,1,path)
call mpi_send(1,1,mpi_integer,0,1,mpi_comm_world,ierror)
! B22^ (with n6)
call mpi_recv(c(8),1,mpi_integer,6,78,mpi_comm_world,stat,ierror)
call mir2_2(hh,gg,nt0,nn3,nn4,122,78,8,path)
call mpi_send(3,1,mpi_integer,6,78,mpi_comm_world,ierror)
! B22^ *B21 (with n6)
call mpi_recv(c(8),1,mpi_integer,6,78,mpi_comm_world,stat,ierror)
call mtr2_2(hh,gg,nt0,nn3,nn4,nn3,nn4,nn1,nn2,
& 522,121,78,1,68,path)
call mpi_send(3,1,mpi_integer,6,78,mpi_comm_world,ierror)
! B12 * [B22^ *B21] (with n6)
call mpi_recv(c(8),1,mpi_integer,6,78,mpi_comm_world,stat,ierror)
call mtr2_2(hh,gg,nt0,nn1,nn2,nn3,nn4,nn1,nn2,
& 112,521,78,1,68,path)
call mpi_send(3,1,mpi_integer,6,78,mpi_comm_world,ierror)
! B11 - [B12 * B22^ *B21] (only n6)
! [B11 - B12 * B22^ *B21]^ (with n6)
call mpi_recv(c(8),1,mpi_integer,6,78,mpi_comm_world,stat,ierror)
call mir2_2(hh,gg,nt0,nn1,nn2,511,78,8,path)
call mpi_send(3,1,mpi_integer,6,78,mpi_comm_world,ierror)
! [- B22^ *B21] * [B11 - B12 * B22^ *B21]^ (with n6)
call mpi_recv(c(8),1,mpi_integer,6,78,mpi_comm_world,stat,ierror)
call mtr2_2(hh,gg,nt0,nn3,nn4,nn1,nn2,nn1,nn2,
& 521,411,78,-1,68,path)
call mpi_send(3,1,mpi_integer,6,78,mpi_comm_world,ierror)
! sol. A11^ * A12

```

```

call mpi_recv(c(8),1,mpi_integer,4,58,mpi_comm_world,stat,ierror)
call mtr4_4(hh,gg,nt0,nn1,nn2,nn3,nn4,nn1,nn2,nn3,nn4,nn5,nn6,nn7,
& nn8,411,412,421,422,113,114,123,124,
& 313,314,323,324,1,78,68,58,path)
call mpi_send(1,1,mpi_integer,4,58,mpi_comm_world,ierror)
! A21 * [A11^ * A12]
call mpi_recv(c(8),1,mpi_integer,4,58,mpi_comm_world,stat,ierror)
call mtr4_4(hh,gg,nt0,nn5,nn6,nn7,nn8,nn1,nn2,nn3,nn4,nn5,nn6,nn7,
& nn8,131,132,141,142,313,314,323,324,
& 533,534,543,544,1,78,68,58,path)
call mpi_send(1,1,mpi_integer,4,58,mpi_comm_world,ierror)
! A22 - A21 * [A11^ * A12]
call mpi_recv(c(8),1,mpi_integer,4,58,mpi_comm_world,stat,ierror)
call sa2(hh,gg,nt0,nn7,nn8,nn7,nn8,144,544,644,path)
call mpi_send(1,1,mpi_integer,4,58,mpi_comm_world,ierror)
! B44^ (with n6)
call mpi_recv(c(8),1,mpi_integer,6,78,mpi_comm_world,stat,ierror)
call mir2_2(hh,gg,nt0,nn7,nn8,644,78,8,path)
call mpi_send(3,1,mpi_integer,6,78,mpi_comm_world,ierror)
! B44^ * B43 (with n6)
call mpi_recv(c(8),1,mpi_integer,6,78,mpi_comm_world,stat,ierror)
call mtr2_2(hh,gg,nt0,nn7,nn8,nn7,nn8,nn5,nn6,
& 744,643,78,1,68,path)
call mpi_send(3,1,mpi_integer,6,78,mpi_comm_world,ierror)
! B34 * [B44^ * B43] (with n6)
call mpi_recv(c(8),1,mpi_integer,6,78,mpi_comm_world,stat,ierror)
call mtr2_2(hh,gg,nt0,nn5,nn6,nn7,nn8,nn5,nn6,
& 634,743,78,1,68,path)
call mpi_send(3,1,mpi_integer,6,78,mpi_comm_world,ierror)
! B33 - [B34 * B44^ * B43] (only n6)
! [B33 - B34 * B44^ * B43]^ (with n6)
call mpi_recv(c(8),1,mpi_integer,6,78,mpi_comm_world,stat,ierror)
call mir2_2(hh,gg,nt0,nn5,nn6,733,78,8,path)
call mpi_send(3,1,mpi_integer,6,78,mpi_comm_world,ierror)
! [- B44^ * B43] * [B33 - B34 * B44^ * B43]^ (with n6)
call mpi_recv(c(8),1,mpi_integer,6,78,mpi_comm_world,stat,ierror)
call mtr2_2(hh,gg,nt0,nn7,nn8,nn5,nn6,nn5,nn6,
& 743,533,78,-1,68,path)

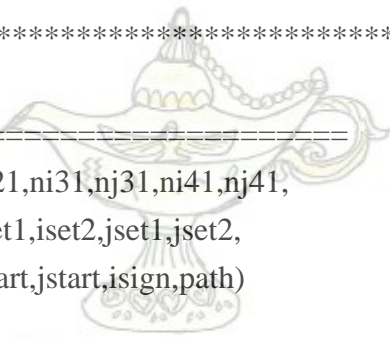
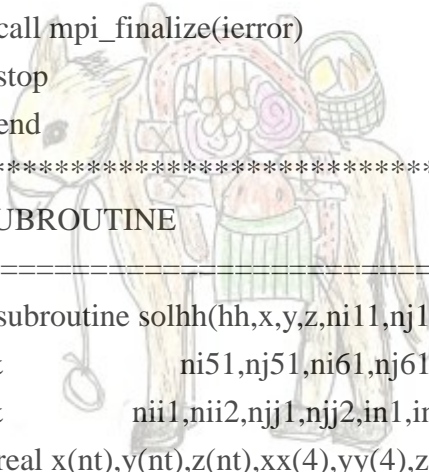
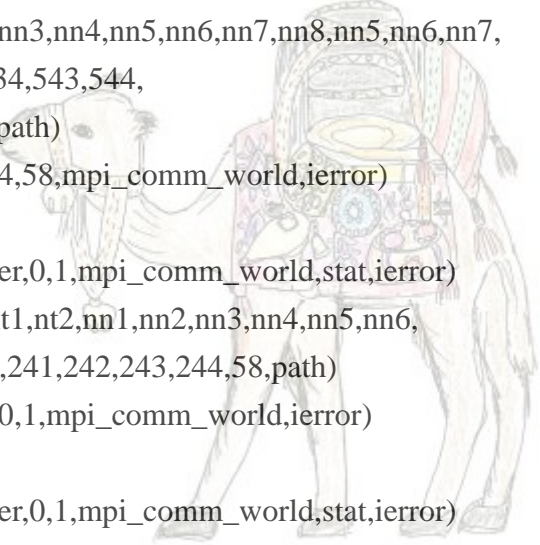
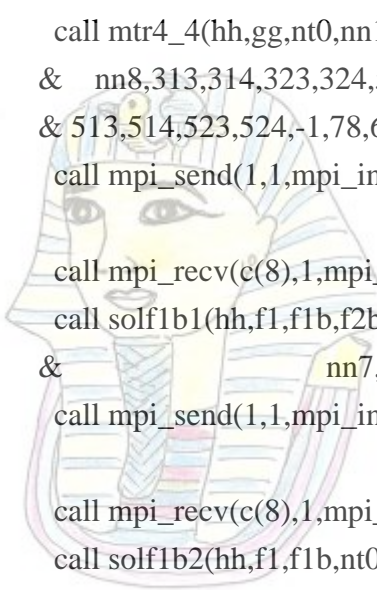
```

```

call mpi_send(3,1,mpi_integer,6,78,mpi_comm_world,ierror)
! [-A11^ * A12] * [A22 - A21 * A11^ * A12]^
call mpi_recv(c(8),1,mpi_integer,4,58,mpi_comm_world,stat,ierror)
call mtr4_4(hh,gg,nt0,nn1,nn2,nn3,nn4,nn5,nn6,nn7,nn8,nn5,nn6,nn7,
& nn8,313,314,323,324,533,534,543,544,
& 513,514,523,524,-1,78,68,58,path)
call mpi_send(1,1,mpi_integer,4,58,mpi_comm_world,ierror)
call mpi_recv(c(8),1,mpi_integer,0,1,mpi_comm_world,stat,ierror)
call solf1b1(hh,f1,f1b,f2b,nt0,nt1,nt2,nn1,nn2,nn3,nn4,nn5,nn6,
& nn7,nn8,8,241,242,243,244,58,path)
call mpi_send(1,1,mpi_integer,0,1,mpi_comm_world,ierror)
call mpi_recv(c(8),1,mpi_integer,0,1,mpi_comm_world,stat,ierror)
call solf1b2(hh,f1,f1b,nt0,nt1,nn1,nn2,nn3,nn4,nn5,nn6,
& nn7,nn8,8,541,542,543,544,51,68,path)
call mpi_send(1,1,mpi_integer,0,1,mpi_comm_world,ierror)

goto 9801
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9899 continue
end if
! =====
call mpi_finalize(ierror)
stop
end
!*****
! SUBROUTINE
!=====
subroutine solhh(hh,x,y,z,ni11,nj11,ni21,nj21,ni31,nj31,ni41,nj41,
& ni51,nj51,ni61,nj61,nt,nt0,iset1,iset2,jset1,jset2,
& nii1,nii2,njj1,njj2,in1,in2,iout,istart,jstart,sign,path)
real x(nt),y(nt),z(nt),xx(4),yy(4),zz(4)
real hh(nt0,nt0)
real xg(4),yg(4),zg(4),p(2),e(2),h(4)
character(len=*) path
call openfilen(41,iout,path)
ni1=ni11+1
nj1=nj11+1

```



戰利品們的驢子

阿拉丁神燈

ni2=ni21+1

nj2=nj21+1

ni3=ni31+1

nj3=nj31+1

ni4=ni41+1

nj4=nj41+1

ni5=ni51+1

nj5=nj51+1

ni6=ni61+1

nj6=nj61+1

nt1=ni1*nj1

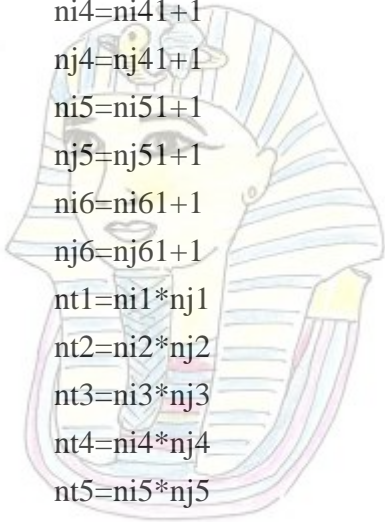
nt2=ni2*nj2

nt3=ni3*nj3

nt4=ni4*nj4

nt5=ni5*nj5

nt6=ni6*nj6



載滿珠寶的駱駝

=====

pai=3.1415927

do ii=1,2

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if(ii.eq.1) is=istart

if(ii.eq.1) ie=istart+nii1-1

if(ii.eq.2) is=istart+nii1

if(ii.eq.2) ie=istart+nii1+nii2-1

do jj=1,2

if(jj.eq.1) js=jstart

if(jj.eq.1) je=jstart+njj1-1

if(jj.eq.2) js=jstart+njj1

if(jj.eq.2) je=jstart+njj1+njj2-1

do i=is,ie

if(ii.eq.1) ix=i-istart+1

if(ii.eq.2) ix=i-istart-nii1+1

call openfileo(42,in1,path)

call openfileo(43,in2,path)

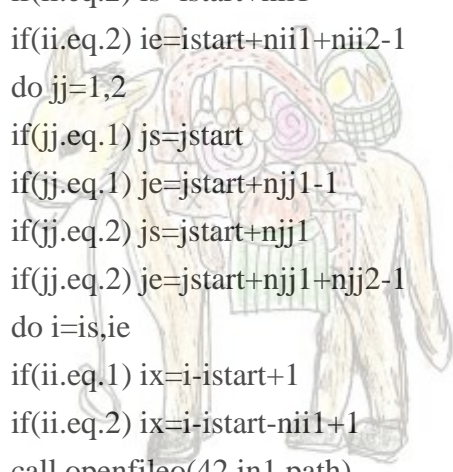
do j=js,je

if(jj.eq.1) jx=j-jstart+1

if(jj.eq.2) jx=j-jstart-njj1+1

icheck=0

do k=1,4



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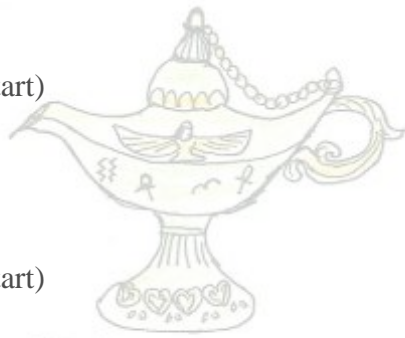
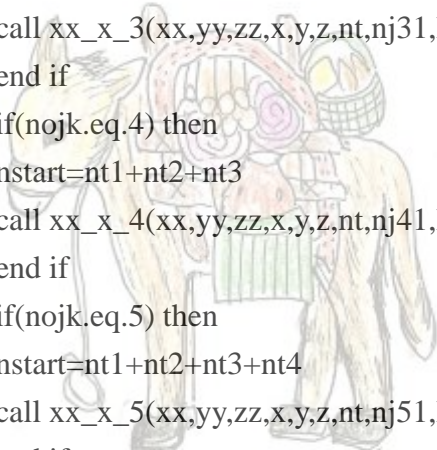
```

if(jj.eq.1) read(42,201) nojk,ki,kj
if(jj.eq.2) read(43,201) nojk,ki,kj
if(nojk.eq.0) then
h(k)=0
icheck=icheck+1
end if
if(nojk.ne.0) then
if(i.eq.j) then
h(k)=0
icheck=icheck+1
end if
if(i.ne.j) then
if(nojk.eq.1) then
nstart=0
call xx_x_1(xx,yy,zz,x,y,z,nt,nj11,ki,kj,nstart)
end if
if(nojk.eq.2) then
nstart=nt1
call xx_x_2(xx,yy,zz,x,y,z,nt,nj21,ki,kj,nstart)
end if
if(nojk.eq.3) then
nstart=nt1+nt2
call xx_x_3(xx,yy,zz,x,y,z,nt,nj31,ki,kj,nstart)
end if
if(nojk.eq.4) then
nstart=nt1+nt2+nt3
call xx_x_4(xx,yy,zz,x,y,z,nt,nj41,ki,kj,nstart)
end if
if(nojk.eq.5) then
nstart=nt1+nt2+nt3+nt4
call xx_x_5(xx,yy,zz,x,y,z,nt,nj51,ki,kj,nstart)
end if
if(nojk.eq.6) then
nstart=nt1+nt2+nt3+nt4+nt5
call xx_x_6(xx,yy,zz,x,y,z,nt,nj61,ki,kj,nstart)
end if
call normal(xx,yy,zz,xn,yn,zn,a)
call xyz_gauss(xg,yg,zg,xx,yy,zz,nojk)

```



載滿珠寶的駱駝



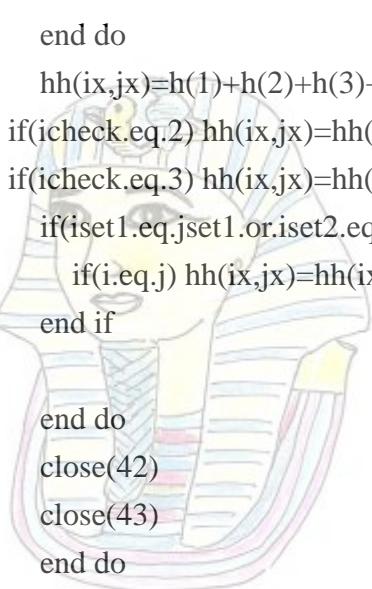
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載滿寶物的馬廐子

```

call hx(h,xg,yg,zg,x,y,z,xn,yn,zn,a,nt,i,k,nojk)
end if
end if
end do
hh(ix,jx)=h(1)+h(2)+h(3)+h(4)
if(icheck.eq.2) hh(ix,jx)=hh(ix,jx)*2
if(icheck.eq.3) hh(ix,jx)=hh(ix,jx)*4
if(iset1.eq.jset1.or.iset2.eq.jset2)then
  if(i.eq.j) hh(ix,jx)=hh(ix,jx)+1
end if
end do
close(42)
close(43)
end do

```



載滿珠寶的駱駝

```

if(isign.eq.1)then
  if(ii.eq.1.and.jj.eq.1) write(41) ((hh(i,j),j=1,njj1),i=1,nii1)
  if(ii.eq.1.and.jj.eq.2) write(41) ((hh(i,j),j=1,njj2),i=1,nii1)
  if(ii.eq.2.and.jj.eq.1) write(41) ((hh(i,j),j=1,njj1),i=1,nii2)
  if(ii.eq.2.and.jj.eq.2) write(41) ((hh(i,j),j=1,njj2),i=1,nii2)
end if

```

```

if(isign.eq.-1)then
  if(ii.eq.1.and.jj.eq.1) write(41) ((-hh(i,j),j=1,njj1),i=1,nii1)
  if(ii.eq.1.and.jj.eq.2) write(41) ((-hh(i,j),j=1,njj2),i=1,nii1)
  if(ii.eq.2.and.jj.eq.1) write(41) ((-hh(i,j),j=1,njj1),i=1,nii2)
  if(ii.eq.2.and.jj.eq.2) write(41) ((-hh(i,j),j=1,njj2),i=1,nii2)
end if

```

```

end do
end do
close(41)

```

201 format(3i5)

```

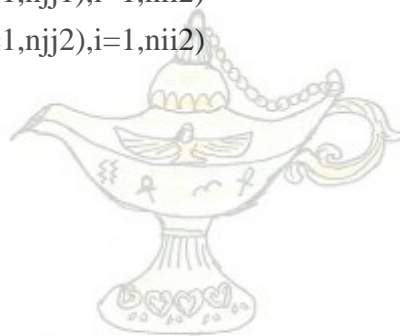
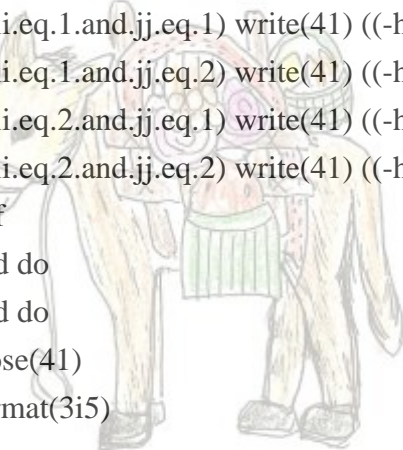
return

```

```

end載滿貨品的驢子

```



阿拉丁神燈

```

c=====
subroutine solgg(gg,x,y,z,ni11,nj11,ni21,nj21,ni31,nj31,ni41,nj41,
&          ni51,nj51,ni61,nj61,nt,nt0,iset1,iset2,jset1,jset2,
&          nii1,nii2,njj1,njj2,in1,in2,iout,istart,jstart,isign,path)
real x(nt),y(nt),z(nt),xx(4),yy(4),zz(4)

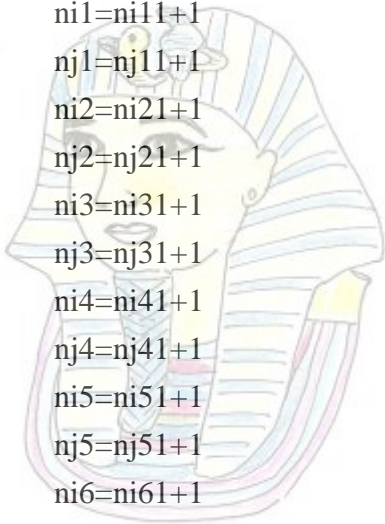
```



```

real gg(nt0,nt0)
real xg(4),yg(4),zg(4),p(2),e(2),g(4)
character(len=*) path
call openfilen(41,iout,path)
ni1=ni11+1
nj1=nj11+1
ni2=ni21+1
nj2=nj21+1
ni3=ni31+1
nj3=nj31+1
ni4=ni41+1
nj4=nj41+1
ni5=ni51+1
nj5=nj51+1
ni6=ni61+1
nj6=nj61+1
nt1=ni1*nj1
nt2=ni2*nj2
nt3=ni3*nj3
nt4=ni4*nj4
nt5=ni5*nj5
nt6=ni6*nj6

```



戴滿珠寶的駱駝

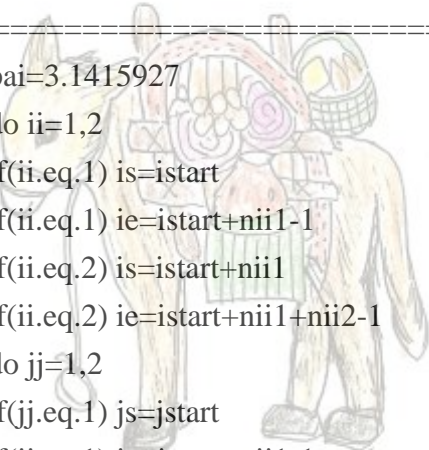
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!=====

```

pai=3.1415927
do ii=1,2
if(ii.eq.1) is=istart
if(ii.eq.1) ie=istart+nii1-1
if(ii.eq.2) is=istart+nii1
if(ii.eq.2) ie=istart+nii1+nii2-1
do jj=1,2
if(jj.eq.1) js=jstart
if(jj.eq.1) je=jstart+njj1-1
if(jj.eq.2) js=jstart+njj1
if(jj.eq.2) je=jstart+njj1+njj2-1
do i=is,ie
if(ii.eq.1) ix=i-istart+1
if(ii.eq.2) ix=i-istart-nii1+1
call openfileo(42,in1,path)

```

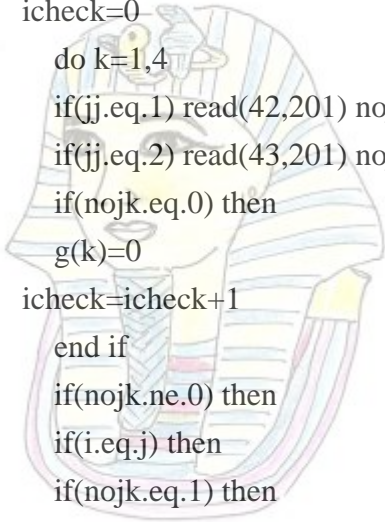


阿拉丁神燈

```

call openfileo(43,in2,path)
do j=js,je
if(jj.eq.1) jx=j-jstart+1
if(jj.eq.2) jx=j-jstart-njj1+1
icheck=0
do k=1,4
if(jj.eq.1) read(42,201) nojk,ki,kj
if(jj.eq.2) read(43,201) nojk,ki,kj
if(nojk.eq.0) then
g(k)=0
icheck=icheck+1
end if
if(nojk.ne.0) then
if(i.eq.j) then
if(nojk.eq.1) then
nstart=0
call xx_x_1(xx,yy,zz,x,y,z,nt,nj11,ki,kj,nstart)
end if
if(nojk.eq.2) then
nstart=nt1
call xx_x_2(xx,yy,zz,x,y,z,nt,nj21,ki,kj,nstart)
end if
if(nojk.eq.3) then
nstart=nt1+nt2
call xx_x_3(xx,yy,zz,x,y,z,nt,nj31,ki,kj,nstart)
end if
if(nojk.eq.4) then
nstart=nt1+nt2+nt3
call xx_x_4(xx,yy,zz,x,y,z,nt,nj41,ki,kj,nstart)
end if
if(nojk.eq.5) then
nstart=nt1+nt2+nt3+nt4
call xx_x_5(xx,yy,zz,x,y,z,nt,nj51,ki,kj,nstart)
end if
if(nojk.eq.6) then
nstart=nt1+nt2+nt3+nt4+nt5
call xx_x_6(xx,yy,zz,x,y,z,nt,nj61,ki,kj,nstart)
end if

```



載滿珠寶的駱駝

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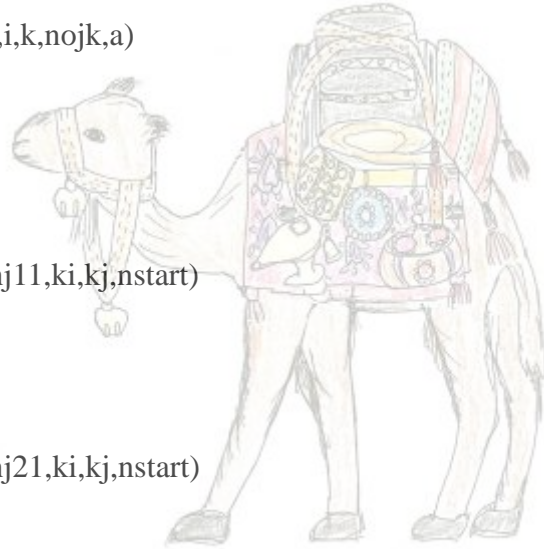
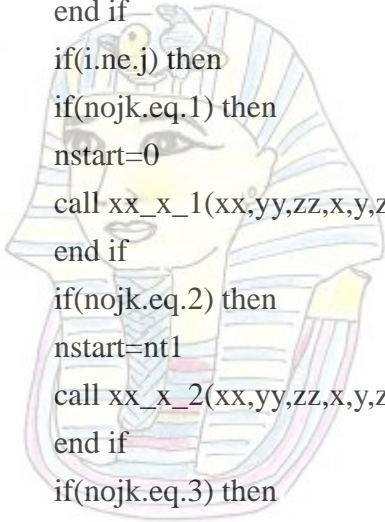


阿拉丁神燈

```

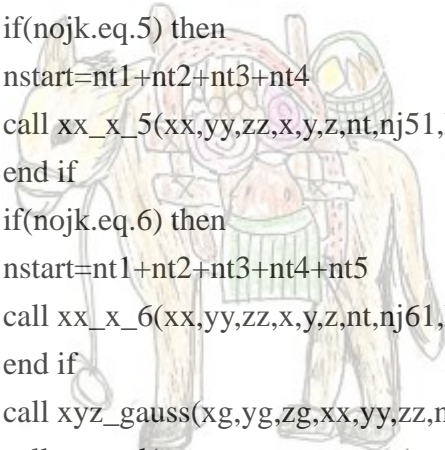
call xyz_gauss(xg,yg,zg,xx,yy,zz,nojk)
call normal(xx,yy,zz,xn,yn,zn,a)
call rsxyz(k,xx,yy,zz,gs,nojk)
call ggg(g,x,y,z,xg,yg,zg,gs,nt,i,k,nojk,a)
end if
if(i.ne.j) then
if(nojk.eq.1) then
nstart=0
call xx_x_1(xx,yy,zz,x,y,z,nt,nj11,ki,kj,nstart)
end if
if(nojk.eq.2) then
nstart=nt1
call xx_x_2(xx,yy,zz,x,y,z,nt,nj21,ki,kj,nstart)
end if
if(nojk.eq.3) then
nstart=nt1+nt2
call xx_x_3(xx,yy,zz,x,y,z,nt,nj31,ki,kj,nstart)
end if
if(nojk.eq.4) then
nstart=nt1+nt2+nt3
call xx_x_4(xx,yy,zz,x,y,z,nt,nj41,ki,kj,nstart)
end if
if(nojk.eq.5) then
nstart=nt1+nt2+nt3+nt4
call xx_x_5(xx,yy,zz,x,y,z,nt,nj51,ki,kj,nstart)
end if
if(nojk.eq.6) then
nstart=nt1+nt2+nt3+nt4+nt5
call xx_x_6(xx,yy,zz,x,y,z,nt,nj61,ki,kj,nstart)
end if
call xyz_gauss(xg,yg,zg,xx,yy,zz,nojk)
call normal(xx,yy,zz,xn,yn,zn,a)
call gx(g,xg,yg,zg,x,y,z,xn,yn,zn,a,nt,i,k,nojk)
end if
end if
end do
gg(ix,jx)=g(1)+g(2)+g(3)+g(4)
end do

```



載滿珠寶的駱駝

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```

close(42)
close(43)
end do
if(isign.eq.1)then
  if(ii.eq.1.and.jj.eq.1) write(41) ((gg(i,j),j=1,njj1),i=1,nii1)
  if(ii.eq.1.and.jj.eq.2) write(41) ((gg(i,j),j=1,njj2),i=1,nii1)
  if(ii.eq.2.and.jj.eq.1) write(41) ((gg(i,j),j=1,njj1),i=1,nii2)
  if(ii.eq.2.and.jj.eq.2) write(41) ((gg(i,j),j=1,njj2),i=1,nii2)
end if
if(isign.eq.-1)then
  if(ii.eq.1.and.jj.eq.1) write(41) ((-gg(i,j),j=1,njj1),i=1,nii1)
  if(ii.eq.1.and.jj.eq.2) write(41) ((-gg(i,j),j=1,njj2),i=1,nii1)
  if(ii.eq.2.and.jj.eq.1) write(41) ((-gg(i,j),j=1,njj1),i=1,nii2)
  if(ii.eq.2.and.jj.eq.2) write(41) ((-gg(i,j),j=1,njj2),i=1,nii2)
end if
end do
end do
close(41)

```

201 format(3i5)
return
end

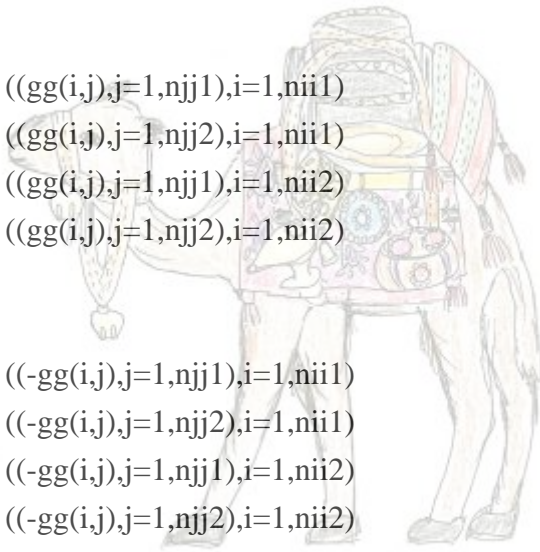
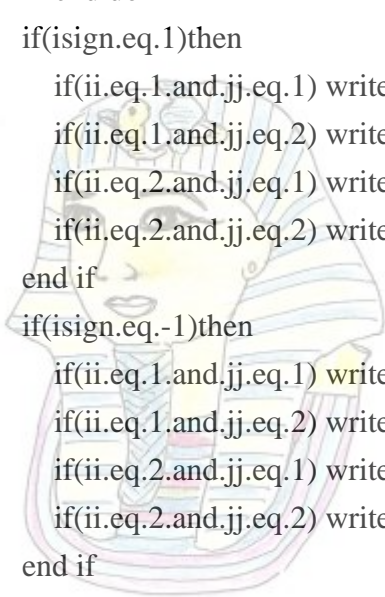
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!=====

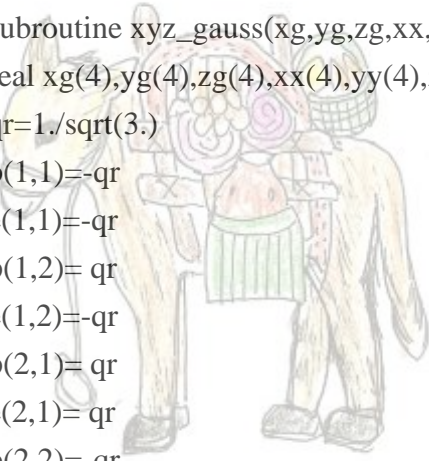
```

subroutine xyz_gauss(xg,yg,zg,xx,yy,zz,nojk)
real xg(4),yg(4),zg(4),xx(4),yy(4),zz(4),p(2,2),e(2,2)
qr=1./sqrt(3.)
p(1,1)=-qr
e(1,1)=-qr
p(1,2)= qr
e(1,2)=-qr
p(2,1)= qr
e(2,1)= qr
p(2,2)=-qr
e(2,2)= qr
n=2
do l=1,n
do m=1,n
f1=(1-p(l,m)-e(l,m)+p(l,m)*e(l,m))/4.
f2=(1+p(l,m)-e(l,m)-p(l,m)*e(l,m))/4.

```



載滿珠寶的駱駝



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載滿寶物的驢子

f3=(1+p(1,m)+e(1,m)+p(1,m)*e(1,m))/4.

f4=(1-p(1,m)+e(1,m)-p(1,m)*e(1,m))/4.

lm=m+n*(1-1)

xg(lm)=f1*xx(1)+f2*xx(2)+f3*xx(3)+f4*xx(4)

yg(lm)=f1*yy(1)+f2*yy(2)+f3*yy(3)+f4*yy(4)

zg(lm)=f1*zz(1)+f2*zz(2)+f3*zz(3)+f4*zz(4)

end do

end do

return

end

!-----

subroutine rsxyz(k,xx,yy,zz,gs,nojk)

real xx(4),yy(4),zz(4)

if(k.eq.1) pc=-1

if(k.eq.2) pc=1

if(k.eq.3) pc=1

if(k.eq.4) pc=-1

rx1=.25*((-1+pc)*xx(1)-(1+pc)*xx(2)+(1+pc)*xx(3)+(1-pc)*xx(4))

ry1=.25*((-1+pc)*yy(1)-(1+pc)*yy(2)+(1+pc)*yy(3)+(1-pc)*yy(4))

rz1=.25*((-1+pc)*zz(1)-(1+pc)*zz(2)+(1+pc)*zz(3)+(1-pc)*zz(4))

if(k.eq.1.or.k.eq.2) then

rsx1=.5*(xx(3)-xx(4))

rsy1=.5*(yy(3)-yy(4))

rsz1=.5*(zz(3)-zz(4))

end if

if(k.eq.3.or.k.eq.4) then

rsx1=.5*(xx(2)-xx(1))

rsy1=.5*(yy(2)-yy(1))

rsz1=.5*(zz(2)-zz(1))

end if

gs11=rsy1*rz1-rsz1*ry1

gs12=rsz1*rx1-rsx1*rz1

gs13=rsx1*ry1-rsy1*rx1

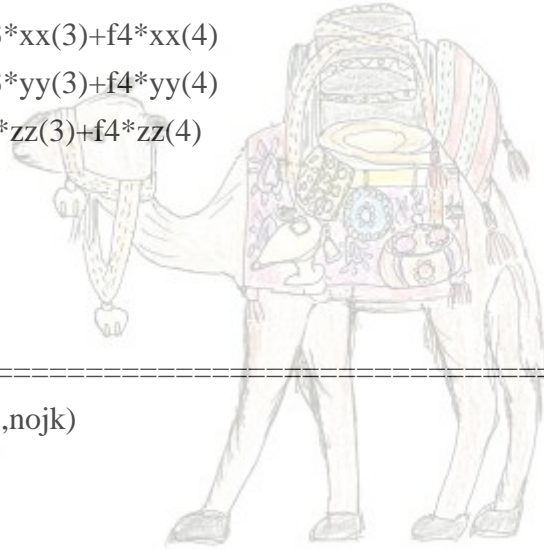
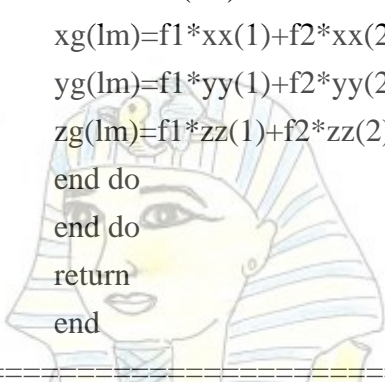
IF(K.EQ.1) PD=-1

IF(K.EQ.2) PD=-1

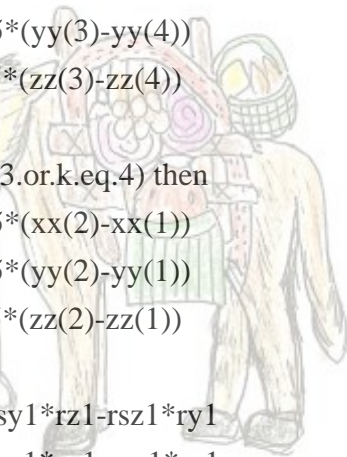
IF(K.EQ.3) PD=1

IF(K.EQ.4) PD=1

RX2=.25*((-1+PD)*XX(1)+(1-PD)*XX(2)+(1+PD)*XX(3)-(1+PD)*XX(4))



戴满珠宝的骆驼



阿拉丁神灯

RY2=.25*((-1+PD)*YY(1)+(1-PD)*YY(2)+(1+PD)*YY(3)-(1+PD)*YY(4))

RZ2=.25*((-1+PD)*ZZ(1)+(1-PD)*ZZ(2)+(1+PD)*ZZ(3)-(1+PD)*ZZ(4))

IF(K.EQ.1.OR.K.EQ.4) THEN

RSX2=-.5*(XX(2)-XX(3))

RSY2=-.5*(YY(2)-YY(3))

RSZ2=-.5*(ZZ(2)-ZZ(3))

END IF

IF(K.EQ.2.OR.K.EQ.3) THEN

RSX2=.5*(XX(4)-XX(1))

RSY2=.5*(YY(4)-YY(1))

RSZ2=.5*(ZZ(4)-ZZ(1))

END IF

GS21=RSY2*RZ2-RSZ2*RY2

GS22=RSZ2*RX2-RSX2*RZ2

GS23=RSX2*RY2-RSY2*RX2

GS=SQRT(GS11**2+GS12**2+GS13**2)+SQRT(GS21**2+GS22**2+GS23*

*2)

return

end

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!=====

subroutine hx(h,xg,yg,zg,x,y,z,xn,yn,zn,a,nt,i,k,nojk)

real x(nt),y(nt),z(nt)

real h(4),xg(4),yg(4),zg(4),p(2,2),e(2,2)

n=2

wl=1

wm=1

qr=1./sqrt(3.)

p(1,1)=-qr

e(1,1)=-qr

p(1,2)= qr

e(1,2)=-qr

p(2,1)= qr

e(2,1)= qr 販賣貨品的驢子

p(2,2)=-qr

e(2,2)= qr

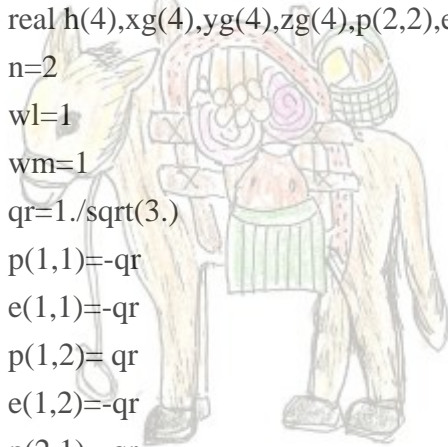
pai=3.1415927

h(k)=0

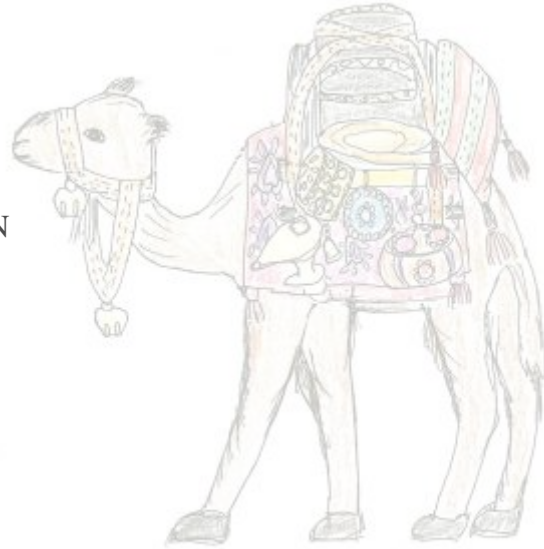
do l=1,n



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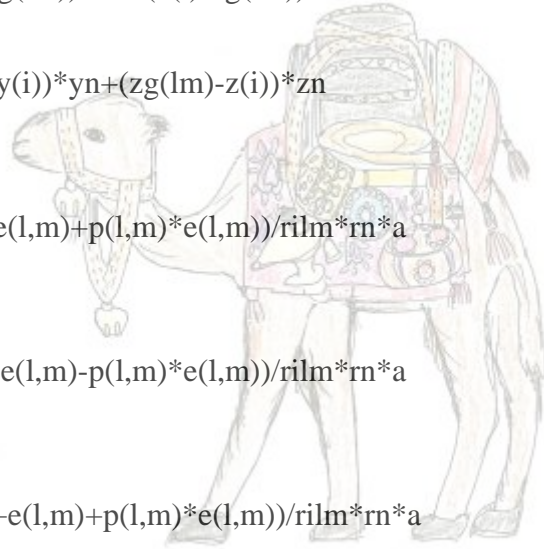
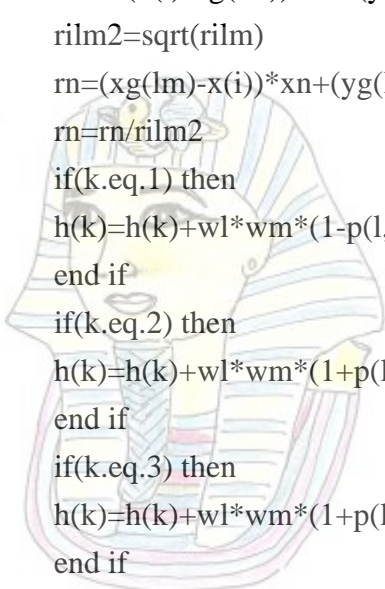


駱駝

```

do m=1,n
lm=m+n*(l-1)
rilm=(x(i)-xg(lm))**2+(y(i)-yg(lm))**2+(z(i)-zg(lm))**2
rilm2=sqrt(rilm)
rn=(xg(lm)-x(i))*xn+(yg(lm)-y(i))*yn+(zg(lm)-z(i))*zn
rn=rn/rilm2
if(k.eq.1) then
h(k)=h(k)+w1*wm*(1-p(l,m)-e(l,m)+p(l,m)*e(l,m))/rilm*rn*a
end if
if(k.eq.2) then
h(k)=h(k)+w1*wm*(1+p(l,m)-e(l,m)-p(l,m)*e(l,m))/rilm*rn*a
end if
if(k.eq.3) then
h(k)=h(k)+w1*wm*(1+p(l,m)+e(l,m)+p(l,m)*e(l,m))/rilm*rn*a
end if
if(k.eq.4) then
h(k)=h(k)+w1*wm*(1-p(l,m)+e(l,m)-p(l,m)*e(l,m))/rilm*rn*a
end if
end do
end do
h(k)=-1./8/pai*h(k)/4
return
end

```



載滿珠寶的駱駝

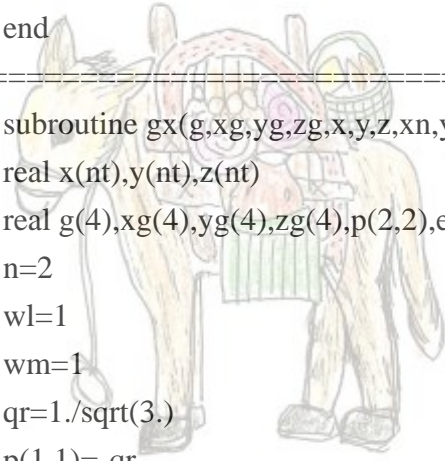
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!=====

```

subroutine gx(g,xg,yg,zg,x,y,z,xn,yn,zn,a,nt,i,k,nojk)
real x(nt),y(nt),z(nt)
real g(4),xg(4),yg(4),zg(4),p(2,2),e(2,2)
n=2
wl=1
wm=1
qr=1./sqrt(3.)
p(1,1)=-qr
e(1,1)=-qr
p(1,2)= qr
e(1,2)=-qr
p(2,1)= qr
e(2,1)= qr
p(2,2)=-qr

```



載滿寶品的馬廐子

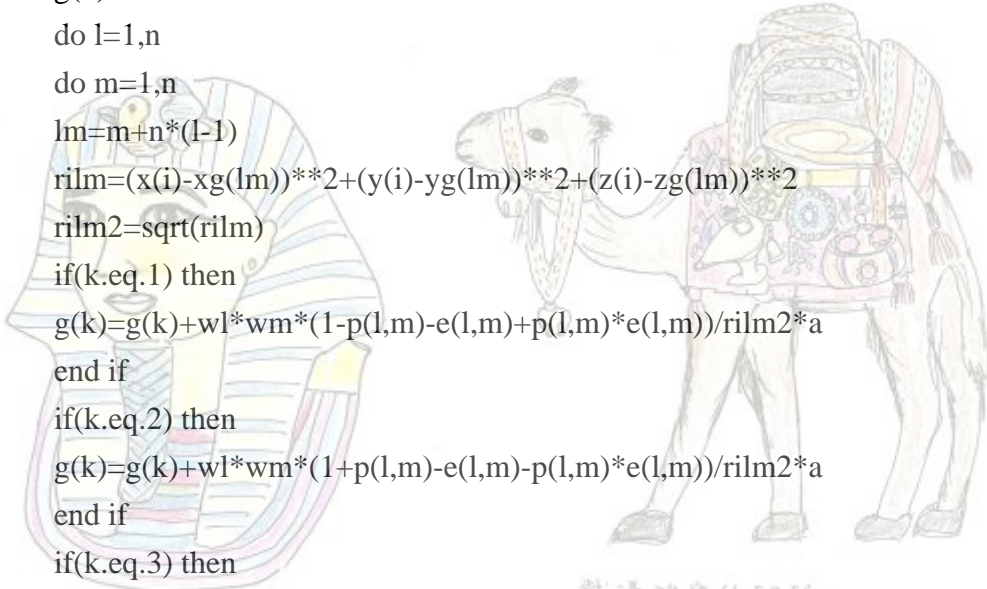


阿拉丁神燈

```

e(2,2)= qr
pai=3.1415927
g(k)=0
do l=1,n
do m=1,n
lm=m+n*(l-1)
rilm=(x(i)-xg(lm))**2+(y(i)-yg(lm))**2+(z(i)-zg(lm))**2
rilm2=sqrt(rilm)
if(k.eq.1) then
g(k)=g(k)+w1*wm*(1-p(l,m)-e(l,m)+p(l,m)*e(l,m))/rilm2*a
end if
if(k.eq.2) then
g(k)=g(k)+w1*wm*(1+p(l,m)-e(l,m)-p(l,m)*e(l,m))/rilm2*a
end if
if(k.eq.3) then
g(k)=g(k)+w1*wm*(1+p(l,m)+e(l,m)+p(l,m)*e(l,m))/rilm2*a
end if
if(k.eq.4) then
g(k)=g(k)+w1*wm*(1-p(l,m)+e(l,m)-p(l,m)*e(l,m))/rilm2*a
end if
end do
end do
g(k)=1./8/pai*g(k)/4
return
end

```



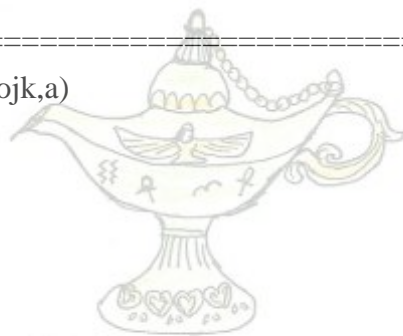
!=====

```

subroutine ggg(g,x,y,z,xg,yg,zg,gs,nt,i,k,nojk,a)
real x(nt),y(nt),z(nt)
real g(4),xg(4),yg(4),zg(4),p(2,2),e(2,2)
n=2
w1=1
wm=1
qr=1./sqrt(3.)
p(1,1)=-qr
e(1,1)=-qr
p(1,2)= qr
e(1,2)=-qr
p(2,1)= qr

```

載寶物的驢子

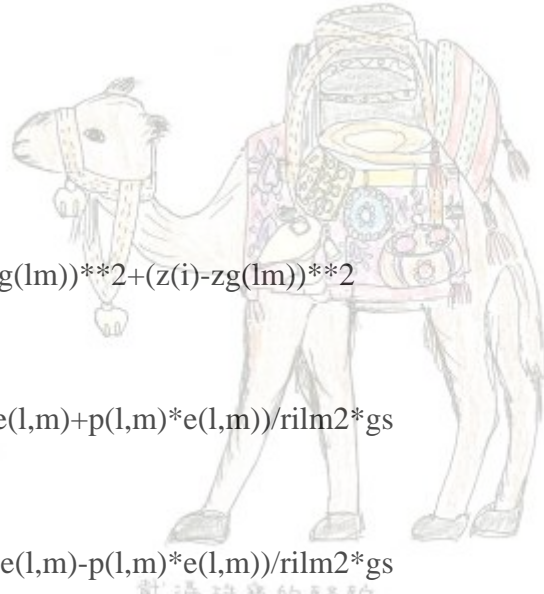
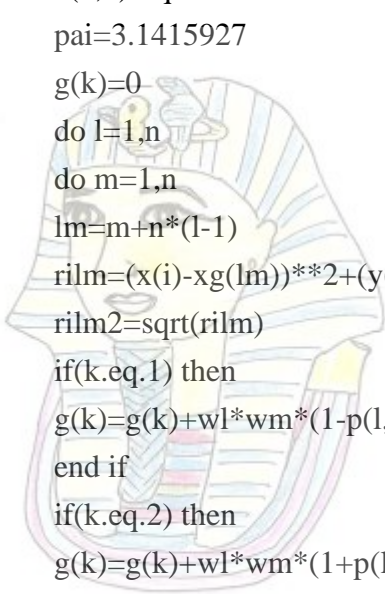


阿拉丁神燈


```

e(2,1)= qr
p(2,2)=-qr
e(2,2)= qr
pai=3.1415927
g(k)=0
do l=1,n
do m=1,n
lm=m+n*(l-1)
rilm=(x(i)-xg(lm))**2+(y(i)-yg(lm))**2+(z(i)-zg(lm))**2
rilm2=sqrt(rilm)
if(k.eq.1) then
g(k)=g(k)+w1*wm*(1-p(l,m)-e(l,m)+p(l,m)*e(l,m))/rilm2*gs
end if
if(k.eq.2) then
g(k)=g(k)+w1*wm*(1+p(l,m)-e(l,m)-p(l,m)*e(l,m))/rilm2*gs
end if
if(k.eq.3) then
g(k)=g(k)+w1*wm*(1+p(l,m)+e(l,m)+p(l,m)*e(l,m))/rilm2*gs
end if
if(k.eq.4) then
g(k)=g(k)+w1*wm*(1-p(l,m)+e(l,m)-p(l,m)*e(l,m))/rilm2*gs
end if
end do
end do
g(k)=1./8/pai*g(k)*2
return
end

```



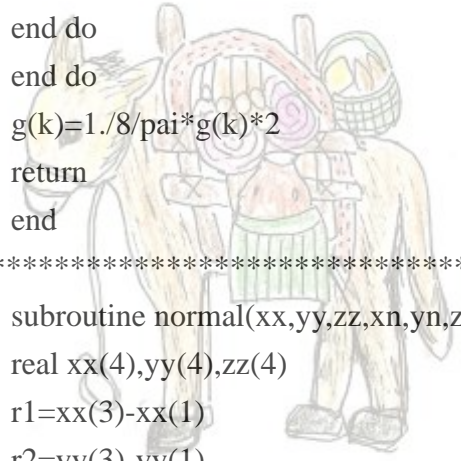
載滿珠寶的駱駝

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```

subroutine normal(xx,yy,zz,xn,yn,zn,a)
real xx(4),yy(4),zz(4)
r1=xx(3)-xx(1)
r2=yy(3)-yy(1)
r3=zz(3)-zz(1)
r4=xx(4)-xx(2)
r5=yy(4)-yy(2)
r6=zz(4)-zz(2)
r=sqrt((r5*r3-r6*r2)**2+(r6*r1-r4*r3)**2+(r4*r2-r5*r1)**2)
xn=(r5*r3-r6*r2)/r

```



載有寶物的驢子



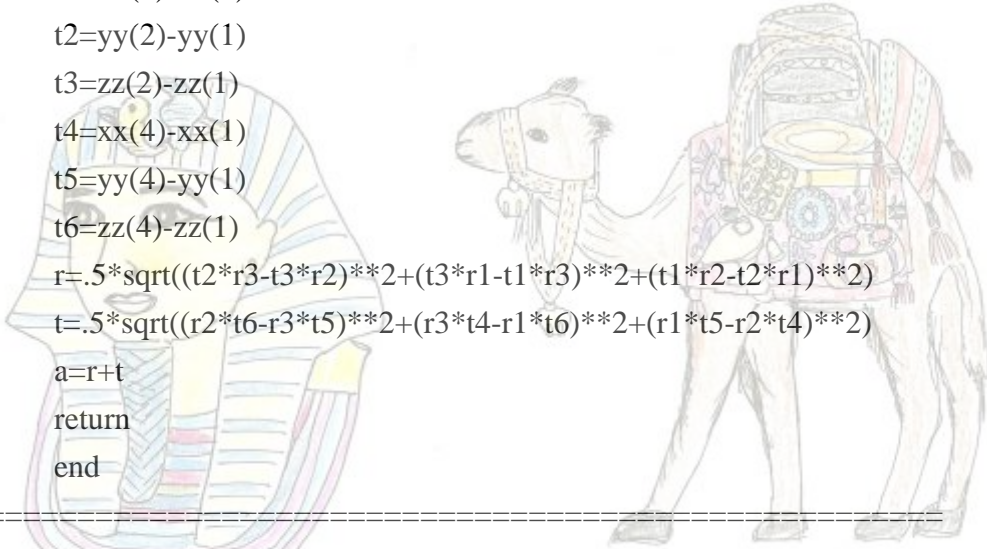
阿拉丁神燈

!*****

```

yn=(r6*r1-r4*r3)/r
zn=(r4*r2-r5*r1)/r
t1=xx(2)-xx(1)
t2=yy(2)-yy(1)
t3=zz(2)-zz(1)
t4=xx(4)-xx(1)
t5=yy(4)-yy(1)
t6=zz(4)-zz(1)
r=.5*sqrt((t2*r3-t3*r2)**2+(t3*r1-t1*r3)**2+(t1*r2-t2*r1)**2)
t=.5*sqrt((r2*t6-r3*t5)**2+(r3*t4-r1*t6)**2+(r1*t5-r2*t4)**2)
a=r+t
return
end

```



!=====

```

subroutine xx_x_1(xx,yy,zz,x,y,z,nt,nj_1,ki,kj,nstart)

```

載滿珠寶的駱駝

```

real x(nt),y(nt),z(nt)
real xx(4),yy(4),zz(4)
i1=kj+1+(nj_1+1)*(ki-1)+nstart
i2=kj +(nj_1+1)*(ki-1)+nstart
i3=kj +(nj_1+1)*ki+nstart
i4=kj+1+(nj_1+1)*ki+nstart
xx(1)=x(i1)
xx(2)=x(i2)
xx(3)=x(i3)
xx(4)=x(i4)
yy(1)=y(i1)
yy(2)=y(i2)
yy(3)=y(i3)
yy(4)=y(i4)
zz(1)=z(i1)
zz(2)=z(i2)
zz(3)=z(i3)
zz(4)=z(i4)
return
end

```

載滿寶品的驢子



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!=====

```

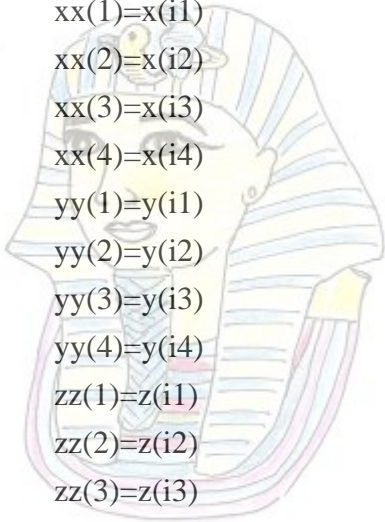
subroutine xx_x_2(xx,yy,zz,x,y,z,nt,nj_1,ki,kj,nstart)
real x(nt),y(nt),z(nt),xx(4),yy(4),zz(4)

```

```

i1=kj+1+(nj_1+1)*ki+nstart
i2=kj +(nj_1+1)*ki+nstart
i3=kj +(nj_1+1)*(ki-1)+nstart
i4=kj+1+(nj_1+1)*(ki-1)+nstart
xx(1)=x(i1)
xx(2)=x(i2)
xx(3)=x(i3)
xx(4)=x(i4)
yy(1)=y(i1)
yy(2)=y(i2)
yy(3)=y(i3)
yy(4)=y(i4)
zz(1)=z(i1)
zz(2)=z(i2)
zz(3)=z(i3)
zz(4)=z(i4)
return
end

```



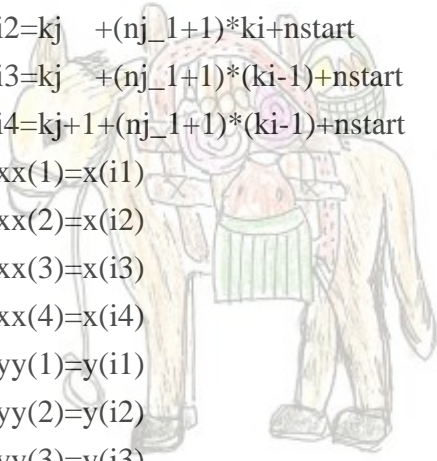
載滿珠寶的駱駝

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```

subroutine xx_x_3(xx,yy,zz,x,y,z,nt,nj_1,ki,kj,nstart)
real x(nt),y(nt),z(nt),xx(4),yy(4),zz(4)
i1=kj+1+(nj_1+1)*ki+nstart
i2=kj +(nj_1+1)*ki+nstart
i3=kj +(nj_1+1)*(ki-1)+nstart
i4=kj+1+(nj_1+1)*(ki-1)+nstart
xx(1)=x(i1)
xx(2)=x(i2)
xx(3)=x(i3)
xx(4)=x(i4)
yy(1)=y(i1)
yy(2)=y(i2)
yy(3)=y(i3)
yy(4)=y(i4)
zz(1)=z(i1)
zz(2)=z(i2)
zz(3)=z(i3)
zz(4)=z(i4)
return

```



載滿寶物的馬



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end

!=====

```
subroutine xx_x_4(xx,yy,zz,x,y,z,nt,nj_1,ki,kj,nstart)
```

```
real x(nt),y(nt),z(nt),xx(4),yy(4),zz(4)
```

```
i1=kj +(nj_1+1)*ki+nstart
```

```
i2=kj+1+(nj_1+1)*ki+nstart
```

```
i3=kj+1+(nj_1+1)*(ki-1)+nstart
```

```
i4=kj +(nj_1+1)*(ki-1)+nstart
```

```
xx(1)=x(i1)
```

```
xx(2)=x(i2)
```

```
xx(3)=x(i3)
```

```
xx(4)=x(i4)
```

```
yy(1)=y(i1)
```

```
yy(2)=y(i2)
```

```
yy(3)=y(i3)
```

```
yy(4)=y(i4)
```

```
zz(1)=z(i1)
```

```
zz(2)=z(i2)
```

```
zz(3)=z(i3)
```

```
zz(4)=z(i4)
```

```
return
```

```
end
```

!=====

```
subroutine xx_x_5(xx,yy,zz,x,y,z,nt,nj_1,ki,kj,nstart)
```

```
real x(nt),y(nt),z(nt),xx(4),yy(4),zz(4)
```

```
i1=kj +(nj_1+1)*ki+nstart
```

```
i2=kj+1+(nj_1+1)*ki+nstart
```

```
i3=kj+1+(nj_1+1)*(ki-1)+nstart
```

```
i4=kj +(nj_1+1)*(ki-1)+nstart
```

```
xx(1)=x(i1)
```

```
xx(2)=x(i2)
```

```
xx(3)=x(i3)
```

```
xx(4)=x(i4)
```

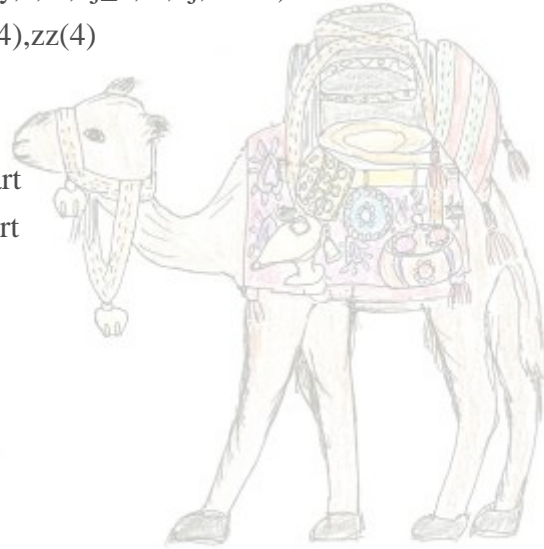
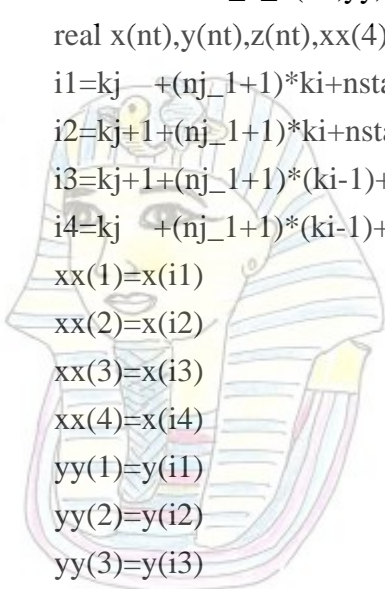
```
yy(1)=y(i1)
```

```
yy(2)=y(i2)
```

```
yy(3)=y(i3)
```

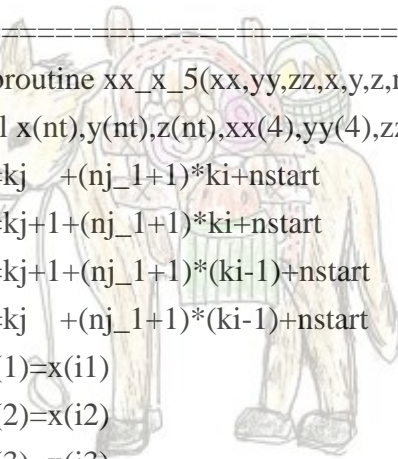
```
yy(4)=y(i4)
```

```
zz(1)=z(i1)
```



載滿珠寶的駱駝

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埃及寶物的驢子



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```

zz(2)=z(i2)
zz(3)=z(i3)
zz(4)=z(i4)
return
end

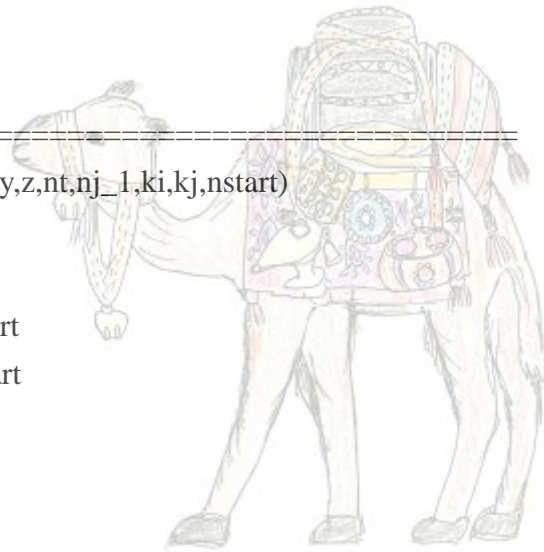
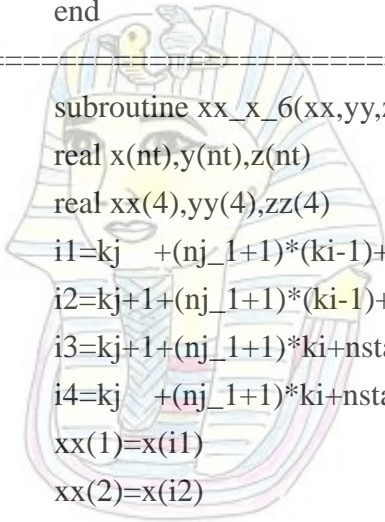
```

```
!-----
```

```

subroutine xx_x_6(xx,yy,zz,x,y,z,nt,nj_1,ki,kj,nstart)
real x(nt),y(nt),z(nt)
real xx(4),yy(4),zz(4)
i1=kj +(nj_1+1)*(ki-1)+nstart
i2=kj+1+(nj_1+1)*(ki-1)+nstart
i3=kj+1+(nj_1+1)*ki+nstart
i4=kj +(nj_1+1)*ki+nstart
xx(1)=x(i1)
xx(2)=x(i2)
xx(3)=x(i3)
xx(4)=x(i4)
yy(1)=y(i1)
yy(2)=y(i2)
yy(3)=y(i3)
yy(4)=y(i4)
zz(1)=z(i1)
zz(2)=z(i2)
zz(3)=z(i3)
zz(4)=z(i4)
return
end

```



載滿珠寶的駱駝

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```

subroutine randu(ix,iy,fl)
iy=mod(12869*ix+6925,32768)
fl=float(iy)/2.0**15
return
end

```

```
!-----
```

```
subroutine randu(ix,iy,fl)
```

```
!-----
```

```

iy=mod(12869*ix+6925,32768)
fl=float(iy)/2.0**15
return
end

```

載滿貨品的驢子



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```
!*****
```

```
! regular wave control program
```

```
!*****
```

```
subroutine regular(u,e,sigma,t,hk,rteta0,nch,blod)
```

```

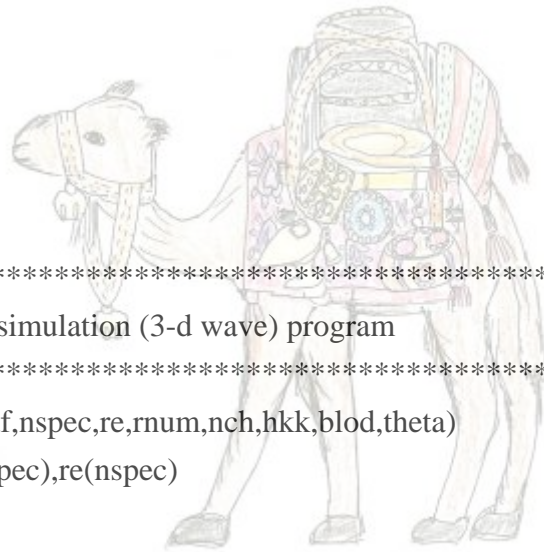
real u(nch)
do i=1,nch
u(i)=e*cos(sigma*t-hk*(i-1)*blod*cos(rteta0))
end do
return
end
!*****
! short crest wave control program
!*****
subroutine cross(u,e1,e2,t,hk1,hk2,rteta01,rteta02,
& sigma1,sigma2,nch,blod)
real u(nch)
do 10 i=1,nch
u(i)=e1*cos(sigma1*t-hk1*(i-1)*blod*cos(rteta01))
& +e2*cos(sigma2*t+hk2*(i-1)*blod*cos(rteta02))
10 continue
return
end
!*****
! solitary wave control program
!*****
subroutine soliton(t,u,xo,omega,tc,rteta0,nch,blod)
real u(nch)
do 10 i=1,nch
u(i)=xo*omega/cosh(omega*(t-tc)-(i-1)*blod*cos(rteta0))**2
10 continue
return
end
!*****
! one directional iregular wave simulation program
!*****
subroutine freq_wave(t,u,s0,df,nspec,re,rnum,nch,hkk,rteta0,blod)
real rnum(nspec),u(nch),s0(nspec),re(nspec),hkk(nspec)
pai2=6.283185308
do i=1,nch
temp=0
do j=1,nspec
sigmat=pai2*df*(j-1)

```

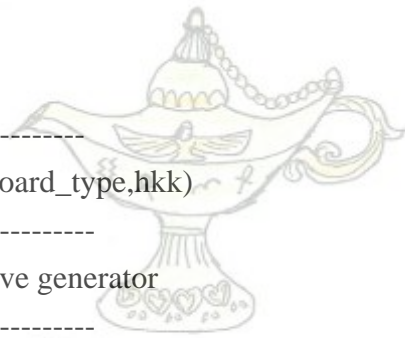
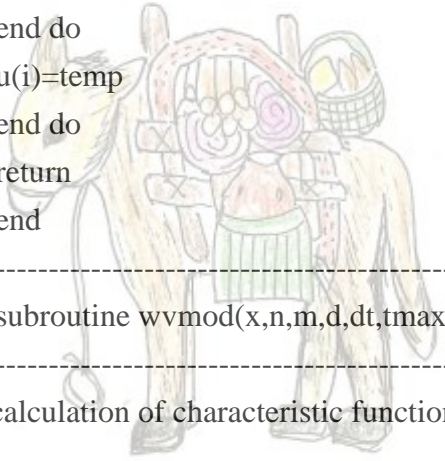
```

aa=re(j)*sqrt(2.*df*s0(j))
temp=temp+aa*sigmat*cos(sigmat*t-hkk(j)*i*blod*cos(rteta0)
/ -rnum(j))
end do
u(i)=temp
end do
return
end
!*****
!      mutiple directional wave simulation (3-d wave) program
!*****
subroutine muti_wave(t,u,s0,df,nspec,re,rnum,nch,hkk,blod,theta)
real rnum(nspec),u(nch),s0(nspec),re(nspec)
real hkk(nspec),theta(nspec)
pai2=6.283185308
do i=1,nch
temp=0
do j=1,nspec
sigmat=pai2*df*(j-1)  2011 埃及尼羅河之旅
aa=re(j)*sqrt(2.*df*s0(j))
temp=temp+aa*sigmat*cos(sigmat*t-hkk(j)*i*blod*cos(theta(j))
/ -rnum(j))
end do
u(i)=temp
end do
return
end
!-----
subroutine wvmod(x,n,m,d,dt,tmax,tmin,board_type,hkk)
!-----
!      calculation of characteristic function of wave generator
!-----
!      x  載新寶物的轆子 阿拉丁神燈 : characteristic function ---- 1.0/f(f,h)
!      n      : data number
!      d      : water depth (m)
!      dt     : time interval (sec)
!      tmax  : maximum period for wave generator (sec)
!      tmin  : minimum period for wave generator (sec)

```



載滿珠寶的駱駝



阿拉丁神燈

! ityp : type of wave generator 1--->piston ; 2--->flap

dimension x(m),hkk(m)

real kh

pai=3.14159265

df=1.0/(2*n*dt)

x(1)=0.0

hkk(1)=0

do 1 i=2,n

t=1.0/(df*(i-1))

if(t .gt. tmax) go to 5

if(t .lt. tmin) go to 5

kh=2.*pai/wavel(t,d)

hkk(i)=kh

if (kh.gt.40.0) then

x(i)=x(i-1)

go to 1

endif

aa=sinh(kh)

bb=cosh(kh)

if(board_type.eq.2) go to 50

x(i)=(aa*bb+kh)/aa**2

go to 1

50 x(i)=kh*(aa*bb+kh)/(aa*(1.0-bb+kh*aa))

go to 1

5 x(i)=0.0

1 continue

return

end

!-----

subroutine specin(x,n,m,dt,e,f,fpeak,speak)

dimension x(m),e(25),f(25)

! caution :coefficent should be changed case by case

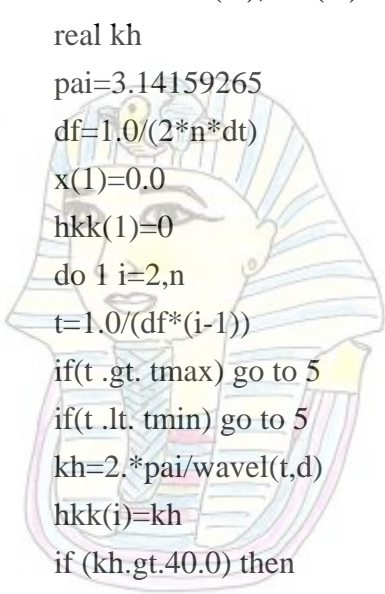
f(1)=0

e(1)=0

do 55 i=2,25

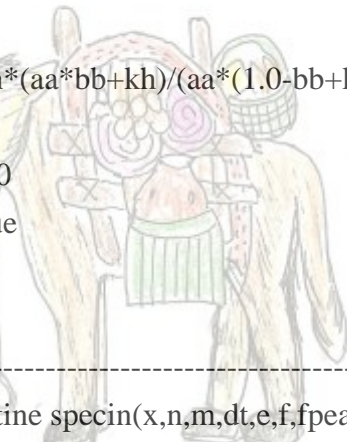
55 f(i)=0.25*(i-1)

x(1)=0.0



戴滿珠寶的駱駝

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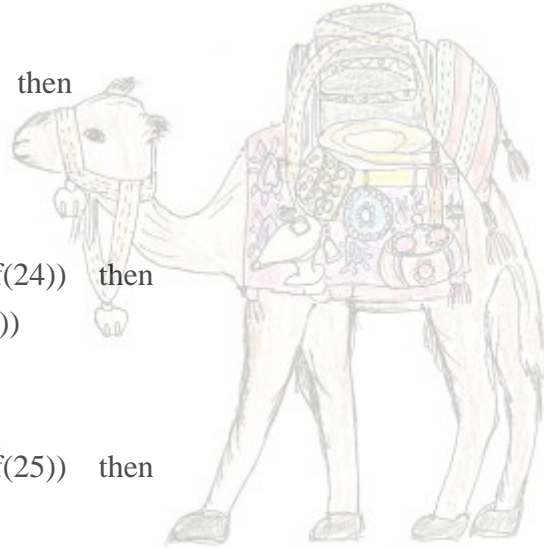
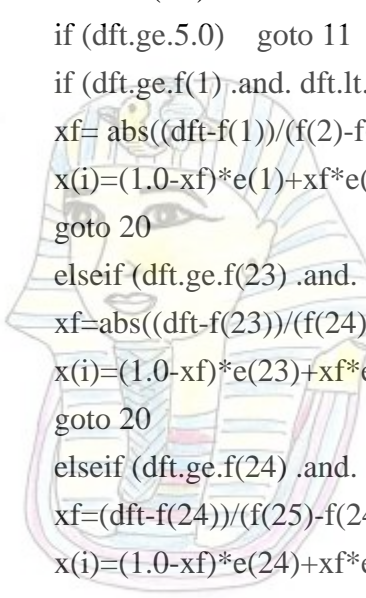


阿拉丁神燈

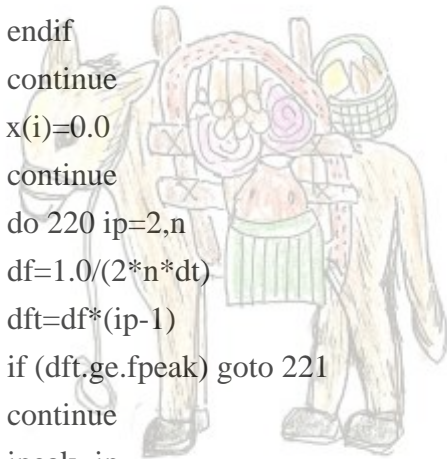

```

do 20 i=2,n
df=1.0/(2*n*dt)
dft=df*(i-1)
if (dft.ge.5.0) goto 11
if (dft.ge.f(1) .and. dft.lt.f(2)) then
xf= abs((dft-f(1))/(f(2)-f(1)))
x(i)=(1.0-xf)*e(1)+xf*e(2)
goto 20
elseif (dft.ge.f(23) .and. dft.lt.f(24)) then
xf=abs((dft-f(23))/(f(24)-f(23)))
x(i)=(1.0-xf)*e(23)+xf*e(24)
goto 20
elseif (dft.ge.f(24) .and. dft.lt.f(25)) then
xf=(dft-f(24))/(f(25)-f(24))
x(i)=(1.0-xf)*e(24)+xf*e(25)
goto 20
endif
do 10 j=2,22
if (dft.ge.f(j) .and. dft.lt.f(j+1)) then
xf=(dft-f(j))/(f(j+1)-f(j))
x(i)=(1.0-xf)*e(j)+xf*e(j+1)
goto 20
endif
10 continue
11 x(i)=0.0
20 continue
do 220 ip=2,n
df=1.0/(2*n*dt)
dft=df*(ip-1)
if (dft.ge.fpeak) goto 221
220 continue
221 ipeak=ip
deltaf=speak-x(ipeak)
nhs=ipeak-20
nhe=ipeak+20
if (nhs.le.1) nhs=2
if (nhe.ge.n) nhe=n
do 230 ih=nhs,nhe

```



載滿珠寶的駱駝

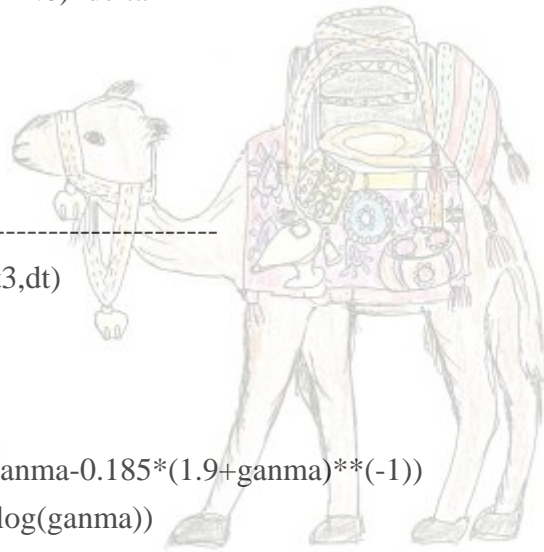
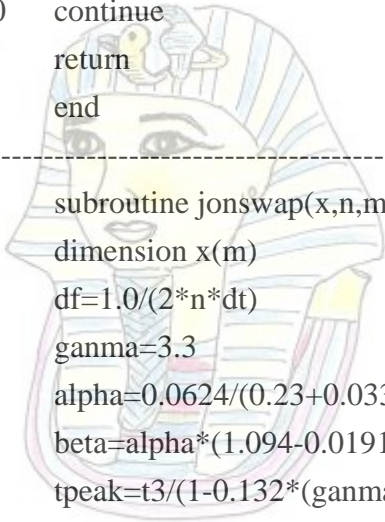


阿拉丁神燈

```

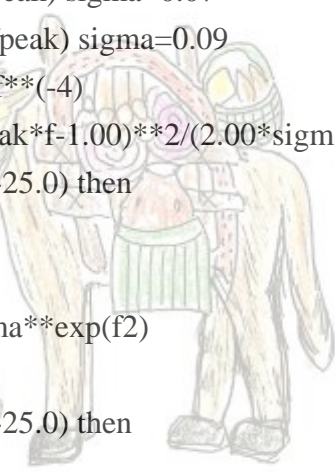
df=1.0/(2*n*dt)
dft=df*(ih-1)
xdelta=-(((dft-fpeak)/0.25)**2+1.0)*deltaf
x(ih)=x(ih)+xdelta
230 continue
return
end
!-----
subroutine jonswap(x,n,m,h3,t3,dt)
dimension x(m)
df=1.0/(2*n*dt)
ganma=3.3
alpha=0.0624/(0.23+0.0336*ganma-0.185*(1.9+ganma)**(-1))
beta=alpha*(1.094-0.01915*log(ganma))
tpeak=t3/(1-0.132*(ganma+0.2)**(-0.559))
fpeak=1/(tpeak)
c1j=beta*h3**2*tpeak**(-4)
c2j=-1.25*tpeak**(-4)
x(1)=0.0
do 2 i=2,n
f=df*(i-1)
if (f.lt.fpeak) sigma=0.07
if (f.ge.fpeak) sigma=0.09
f1=c2j*f**(-4)
f2=-((tpeak*f-1.00)**2)/(2.00*sigma**2)
if (f2.lt.-25.0) then
f0=1.0
else
f0=ganma**exp(f2)
end if
if (f1.lt.-25.0) then
x(i)=0.0
else
x(i)=c1j*f**(-5)*exp(f1)*f0
end if
2 continue
return
end

```



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2

!-----

subroutine bm0(x,n,m,h3,t3,dt)

!-----

! computation of bretschnider-mitsuyasu type spectrum

!-----

! x : bretschnider mitsuyasu type frequency spectrum

! n : data number of spectrum

! h3 : significant wave height

! t3 : significant wave period

! dt : time interval

dimension x(m)

df=1.0/(2*n*dt)

a=0.257*h3**2

b=t3**(-4)

c=-1.03*b

ab=a*b

x(1)=0.0

do 1 i=2,n

f0=df*(i-1)

cfb=f0**(-4)

cf=c*cfb

if(cf .lt. -25.0) go to 2

x(i)=ab*cfb/f0*exp(cf)

go to 1

2 x(i)=0.

1 continue

return

end

!-----

subroutine bms(x,n,m,h3,t3,dt)

!-----

! computation of shuusei bretschnider-mitsuyasu type spectrum

!-----

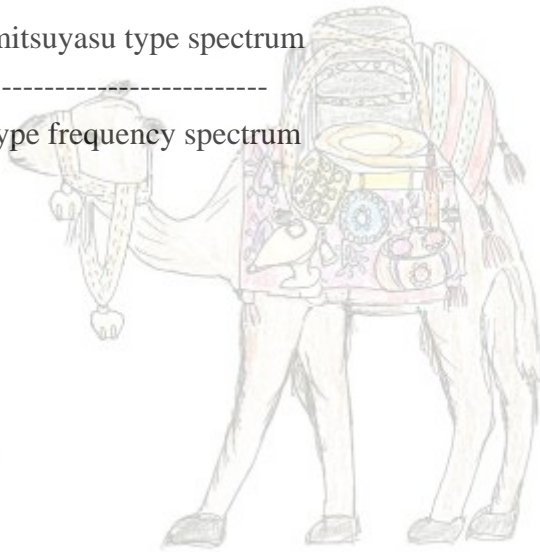
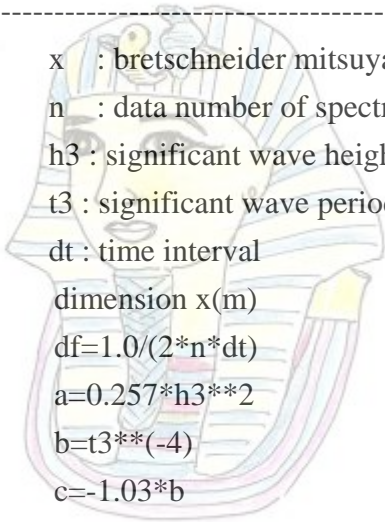
! x : shuusei bretschnider mitsuyasu type frequency spectrum

! n : data number of spectrum

! h3 : significant wave height

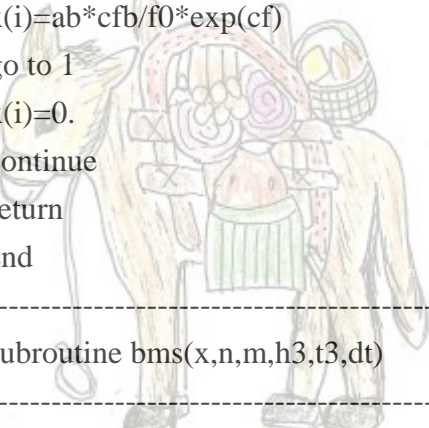
! t3 : significant wave period

! dt : time interval



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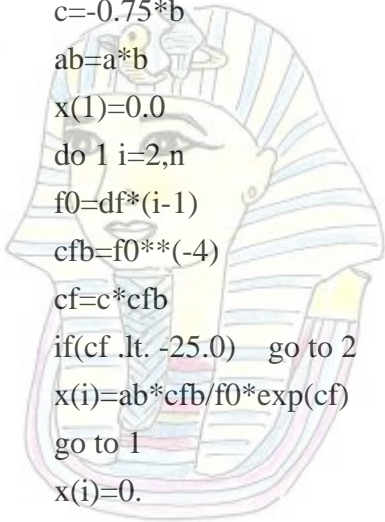


阿拉丁神燈

```

dimension x(m)
df=1.0/(2*n*dt)
a=0.205*h3**2
b=t3**(-4)
c=-0.75*b
ab=a*b
x(1)=0.0
do 1 i=2,n
f0=df*(i-1)
cfb=f0**(-4)
cf=c*cfb
if(cf.lt.-25.0) go to 2
x(i)=ab*cfb/f0*exp(cf)
go to 1
2 x(i)=0.
1 continue
return
end

```



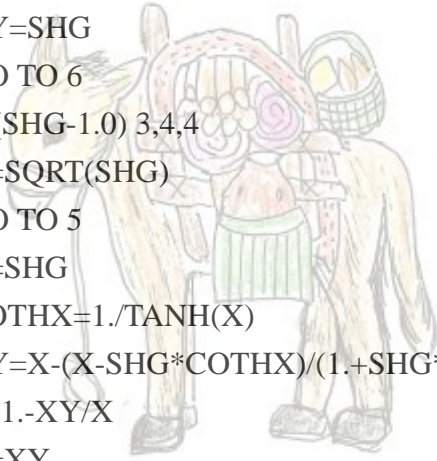
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! ***** 阿拉伯之旅 *****

```

subroutine kh(SHG,Hk)
IF(SHG-10.) 2,2,1
1 XY=SHG
GO TO 6
2 IF(SHG-1.0) 3,4,4
3 X=SQRT(SHG)
GO TO 5
4 X=SHG
5 COTHX=1./TANH(X)
XY=X-(X-SHG*COTHX)/(1.+SHG*(COTHX**2-1.))
E=1.-XY/X
X=XY
IF(ABS(E)-0.0005)6,5,5
6 hk=XY
RETURN
END

```



阿拉丁神燈

!=====

=====

```
function wavel(t,d)
```

```
!-----
```

```
! calculation of wave length (m)
```

```
!-----
```

```
! t : wave period (sec)
```

```
! d : water depth (m)
```

```
pai2=6.283185
```

```
dd=pai2*d/(9.8*t**2/pai2)
```

```
x=dd
```

```
if(dd .lt. 1.0) x=sqrt(dd)
```

```
4 coth=1.0/tanh(x)
```

```
xx=x-(x-dd*coth)/(1.0+dd*(coth**2-1.0))
```

```
emin=1.0-xx/x
```

```
x=xx
```

```
if(abs(emin) .ge. 0.0005) go to 4
```

```
wavel=pai2/x*d
```

```
return
```

```
end
```

```
!*****
```

```
subroutine seki(a,b,m,na,nk,nb)
```

```
real a(m,m),b(m,m),c(10000)
```

```
do 100 i=1,na
```

```
do 101 k=1,nk
```

```
c(k)=a(i,k)
```

```
101 continue
```

```
do 100 j=1,nb
```

```
r=0.
```

```
do 102 k=1,nk
```

```
r=r+c(k)*b(k,j)
```

```
102 continue
```

```
a(i,j)=r
```

```
100 continue
```

```
return
```

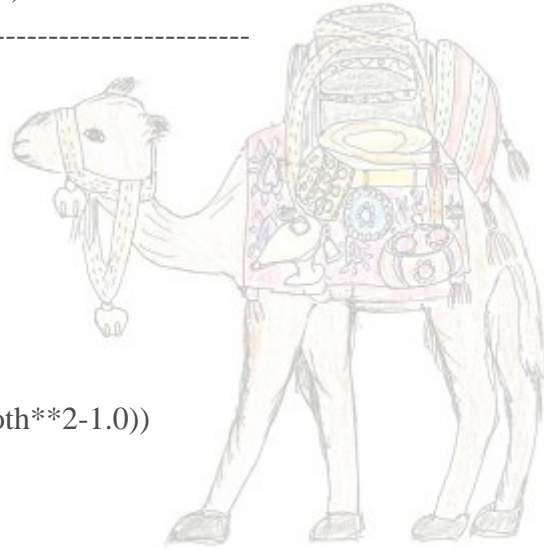
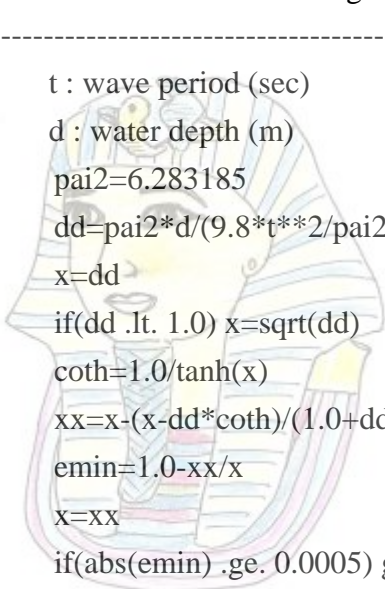
```
end
```

```
!=====
```

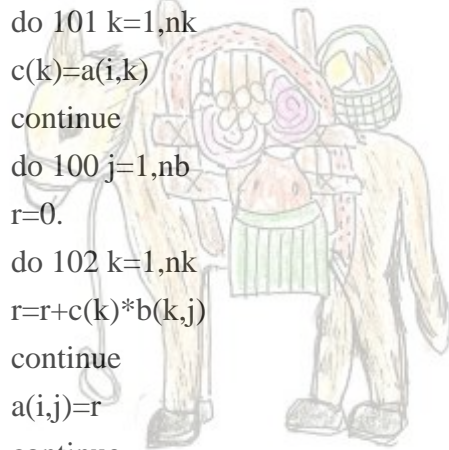
```
subroutine minvs(a,ko,n,eps,ill)
```

```
real a(ko,ko)
```

```
integer x(10000)
```



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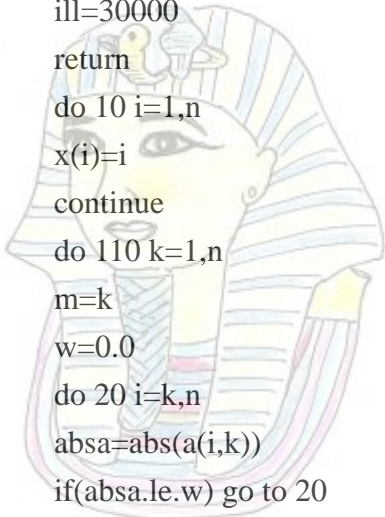


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```

logical b
ill=0
if((ko.ge.n).and.(n.ge.2).and.(n.le.10000).and.(eps.gt.0.0))
/ go to 1
ill=30000
return
1 do 10 i=1,n
x(i)=i
10 continue
do 110 k=1,n
m=k
w=0.0
do 20 i=k,n
absa=abs(a(i,k))
if(absa.le.w) go to 20
w=absa
m=i
20 continue
if(m.eq.k) go to 50
l=x(m)
x(m)=x(k)
x(k)=l
do 40 j=1,n
w=a(k,j)
a(k,j)=a(m,j)
a(m,j)=w
40 continue
50 if(abs(a(k,k)).ge.eps) go to 60
ill=k
return
60 p=1.0/a(k,k)
do 70 j=1,n
a(k,j)=a(k,j)*p
70 continue
do 100 i=1,n
t=-a(i,k)
b=(i.ne.k).and.(t.ne.0.0)
if(.not.b) go to 100

```



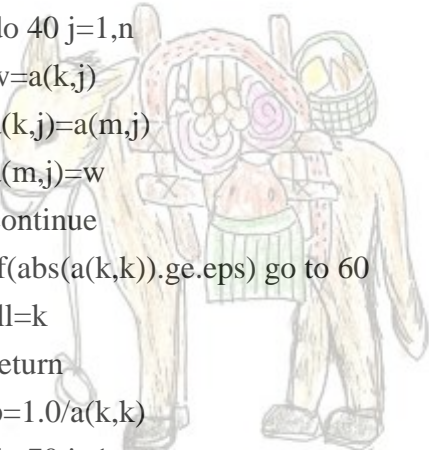
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```

l=x(m)
x(m)=x(k)
x(k)=l
do 40 j=1,n
w=a(k,j)
a(k,j)=a(m,j)
a(m,j)=w
40 continue
50 if(abs(a(k,k)).ge.eps) go to 60
ill=k
return
60 p=1.0/a(k,k)
do 70 j=1,n
a(k,j)=a(k,j)*p
70 continue
do 100 i=1,n
t=-a(i,k)
b=(i.ne.k).and.(t.ne.0.0)
if(.not.b) go to 100

```



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```

subroutine mtr4_2(hh,gg,nx,na1,na2,na3,na4,nb1,nb2,nb3,nb4,
&                nc1,nc2,nc3,nc4,ina1,ina2,ina3,ina4,
&                inb1,inb2,inb3,inb4,iout1,iout2,iout3,iout4,
&                isign,itmp1,itmp2,itmp3,path)
  real hh(nx,nx),gg(nx,nx)
  character(len=*) path
  call mtr2(hh,gg,nx,na1,na2,nb1,nb2,nc3,nc4,ina1,inb2,itmp2,
&          isign,itmp1,path)
  call mtr2(hh,gg,nx,na1,na2,nb3,nb4,nc3,nc4,ina2,inb4,itmp3,
&          isign,itmp1,path)
  call wa2 (hh,gg,nx,na1,na2,nc3,nc4,itmp2,itmp3,iout2,path)
  return
end

```

!-----

```

subroutine mtr4_3(hh,gg,nx,na1,na2,na3,na4,nb1,nb2,nb3,nb4,
&                nc1,nc2,nc3,nc4,ina1,ina2,ina3,ina4,
&                inb1,inb2,inb3,inb4,iout1,iout2,iout3,iout4,
&                isign,itmp1,itmp2,itmp3,path)

```

real hh(nx,nx),gg(nx,nx) 011 埃及尼羅河之旅

```

  character(len=*) path
  call mtr2(hh,gg,nx,na3,na4,nb1,nb2,nc1,nc2,ina3,inb1,itmp2,
&          isign,itmp1,path)
  call mtr2(hh,gg,nx,na3,na4,nb3,nb4,nc1,nc2,ina4,inb3,itmp3,
&          isign,itmp1,path)
  call wa2 (hh,gg,nx,na3,na4,nc1,nc2,itmp2,itmp3,iout3,path)
  return
end

```

!-----

```

subroutine mtr4_4(hh,gg,nx,na1,na2,na3,na4,nb1,nb2,nb3,nb4,
&                nc1,nc2,nc3,nc4,ina1,ina2,ina3,ina4,
&                inb1,inb2,inb3,inb4,iout1,iout2,iout3,iout4,
&                isign,itmp1,itmp2,itmp3,path)

```

real hh(nx,nx),gg(nx,nx) 阿拉丁神燈

```

  character(len=*) path
  call mtr2(hh,gg,nx,na3,na4,nb1,nb2,nc3,nc4,ina3,inb2,itmp2,
&          isign,itmp1,path)
  call mtr2(hh,gg,nx,na3,na4,nb3,nb4,nc3,nc4,ina4,inb4,itmp3,
&          isign,itmp1,path)

```



```

call wa2 (hh,gg,nx,na3,na4,nc3,nc4,itmp2,itmp3,iout4,path)
return
end

```

```
!      mtr2
```

```
!+++++
```

```
subroutine mtr2(a,b,nx,na,nb,nc,nd,ne,nf,l,m,k,sign,itmp,path)
```

```
real a(nx,nx),b(nx,nx)
```

```
character(len=*) path
```

```
call openfileo(41,l,path)
```

```
call openfileo(42,m,path)
```

```
call openfilen(43,k,path)
```

```
call openfilen(44,itmp,path)
```

```
read(41) ((a(i,j),j=1,nc),i=1,na)
```

```
read(42) ((b(i,j),j=1,ne),i=1,nc)
```

```
call seki(a,b,nx,na,nc,ne)
```

```
write(44) ((a(i,j),j=1,ne),i=1,na)
```

```
backspace 41
```

```
read(41) ((a(i,j),j=1,nc),i=1,na)
```

```
read(42) ((b(i,j),j=1,nf),i=1,nc) 埃及尼羅河之旅
```

```
call seki (a,b,nx,na,nc,nf)
```

```
write(44) ((a(i,j),j=1,nf),i=1,na)
```

```
read(41) ((a(i,j),j=1,nd),i=1,na)
```

```
read(42) ((b(i,j),j=1,ne),i=1,nd)
```

```
call seki (a,b,nx,na,nd,ne)
```

```
rewind 44
```

```
read(44) ((b(i,j),j=1,ne),i=1,na)
```

```
call wa (a,b,nx,na,ne)
```

```
if(isign.eq.1) write(43) ((b(i,j),j=1,ne),i=1,na)
```

```
if(isign.eq.-1) write(43) ((-b(i,j),j=1,ne),i=1,na)
```

```
read(41) ((a(i,j),j=1,nc),i=1,nb)
```

```
read(41) ((a(i,j),j=1,nd),i=1,nb)
```

```
rewind 41
```

```
read(41) ((a(i,j),j=1,nc),i=1,na)
```

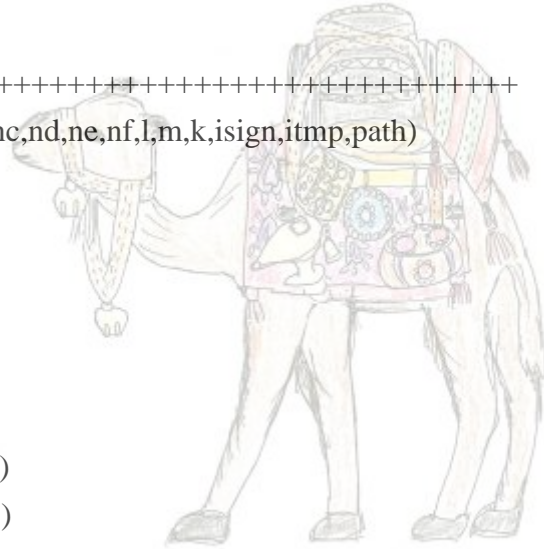
```
read(41) ((a(i,j),j=1,nd),i=1,na)
```

```
read(42) ((b(i,j),j=1,nf),i=1,nd)
```

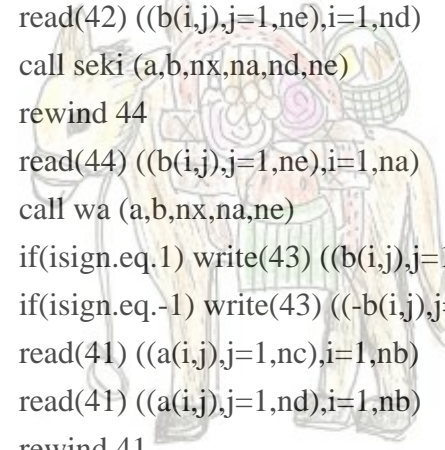
```
call seki (a,b,nx,na,nd,nf)
```

```
read(44) ((b(i,j),j=1,nf),i=1,na)
```

```
call wa (a,b,nx,na,nf)
```



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```

if(isign.eq.1) write(43) ((b(i,j),j=1,nf),i=1,na)
if(isign.eq.-1) write(43) ((-b(i,j),j=1,nf),i=1,na)
rewind 42

```

```

read(42) ((b(i,j),j=1,ne),i=1,nc)
read(41) ((a(i,j),j=1,nc),i=1,nb)
call seki (a,b,nx,nb,nc,ne)
rewind 44

```

```

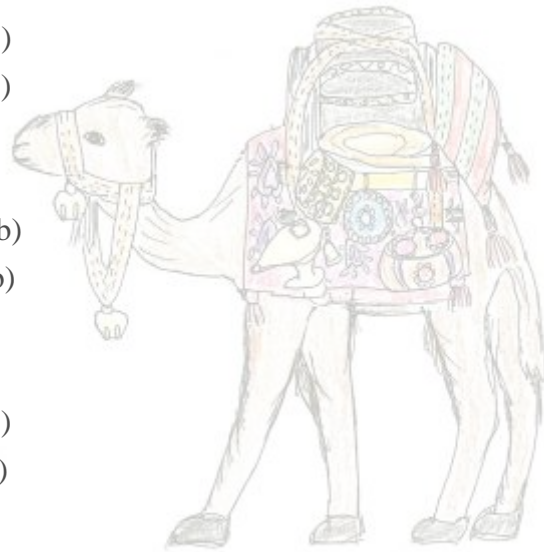
write(44) ((a(i,j),j=1,ne),i=1,nb)
read(41) ((b(i,j),j=1,nd),i=1,nb)
backspace 41
backspace 41

```

```

read(41) ((a(i,j),j=1,nc),i=1,nb)
read(42) ((b(i,j),j=1,nf),i=1,nc)
call seki (a,b,nx,nb,nc,nf)
write(44) ((a(i,j),j=1,nf),i=1,nb)
read(41) ((a(i,j),j=1,nd),i=1,nb)
read(42) ((b(i,j),j=1,ne),i=1,nd)
call seki (a,b,nx,nb,nd,ne)
rewind 44

```



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```

read(44) ((b(i,j),j=1,ne),i=1,nb)
call wa (a,b,nx,nb,ne)
if(isign.eq.1) write(43) ((b(i,j),j=1,ne),i=1,nb)
if(isign.eq.-1) write(43) ((-b(i,j),j=1,ne),i=1,nb)
backspace 41

```

```

read(41) ((a(i,j),j=1,nd),i=1,nb)
read(42) ((b(i,j),j=1,nf),i=1,nd)
call seki (a,b,nx,nb,nd,nf)
read(44) ((b(i,j),j=1,nf),i=1,nb)
call wa (b,a,nx,nb,nf)

```

```

if(isign.eq.1) write(43) ((a(i,j),j=1,nf),i=1,nb)
if(isign.eq.-1) write(43) ((-a(i,j),j=1,nf),i=1,nb)
close(44)

```

```

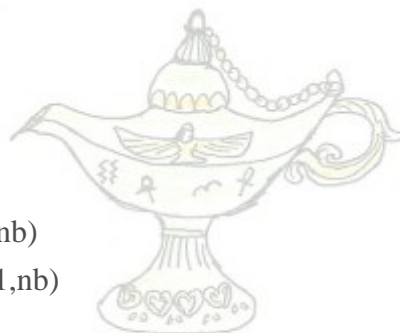
close(41)
close(42)
close(43)

```

```

return
end

```



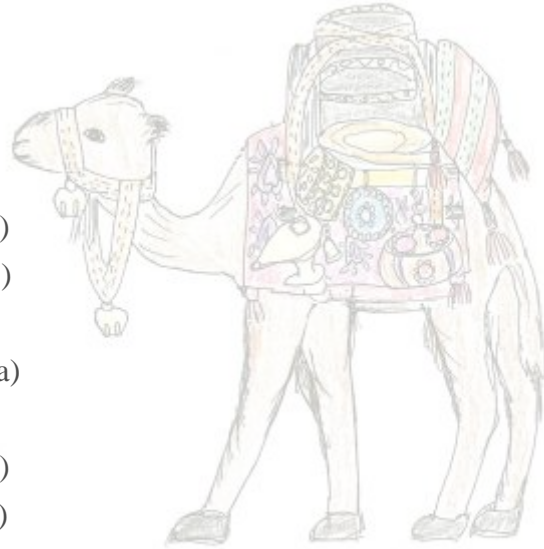
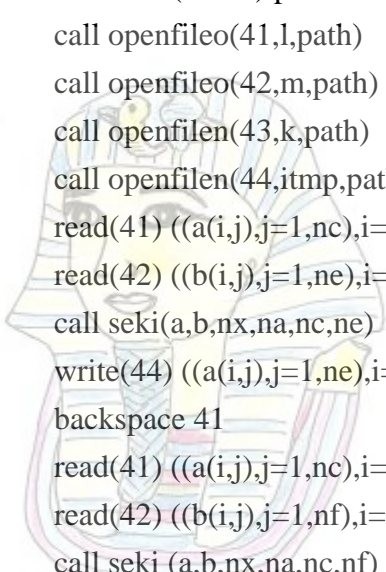
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!=====

```

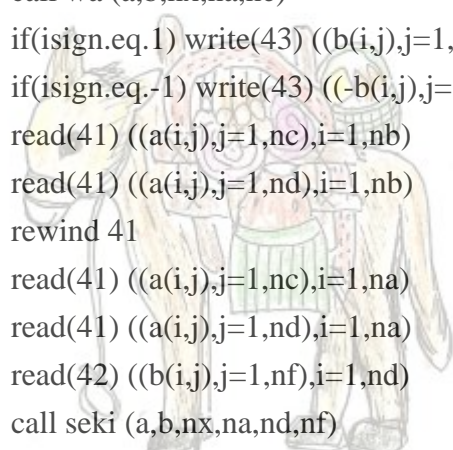
subroutine mtr2_1(a,b,nx,na,nb,nc,nd,ne,nf,l,m,k,sign,itmp,path)
real a(nx,nx),b(nx,nx)
character(len=*) path
call openfileo(41,l,path)
call openfileo(42,m,path)
call openfilen(43,k,path)
call openfilen(44,itmp,path)
read(41) ((a(i,j),j=1,nc),i=1,na)
read(42) ((b(i,j),j=1,ne),i=1,nc)
call seki(a,b,nx,na,nc,ne)
write(44) ((a(i,j),j=1,ne),i=1,na)
backspace 41
read(41) ((a(i,j),j=1,nc),i=1,na)
read(42) ((b(i,j),j=1,nf),i=1,nc)
call seki(a,b,nx,na,nc,nf)
write(44) ((a(i,j),j=1,nf),i=1,na)
read(41) ((a(i,j),j=1,nd),i=1,na)
read(42) ((b(i,j),j=1,ne),i=1,nd)
call seki(a,b,nx,na,nd,ne)
rewind 44
read(44) ((b(i,j),j=1,ne),i=1,na)
call wa(a,b,nx,na,ne)
if(sign.eq.1) write(43) ((b(i,j),j=1,ne),i=1,na)
if(sign.eq.-1) write(43) ((-b(i,j),j=1,ne),i=1,na)
read(41) ((a(i,j),j=1,nc),i=1,nb)
read(41) ((a(i,j),j=1,nd),i=1,nb)
rewind 41
read(41) ((a(i,j),j=1,nc),i=1,na)
read(41) ((a(i,j),j=1,nd),i=1,na)
read(42) ((b(i,j),j=1,nf),i=1,nd)
call seki(a,b,nx,na,nd,nf)
read(44) ((b(i,j),j=1,nf),i=1,na)
call wa(a,b,nx,na,nf)
if(sign.eq.1) write(43) ((b(i,j),j=1,nf),i=1,na)
if(sign.eq.-1) write(43) ((-b(i,j),j=1,nf),i=1,na)
close(44)
close(41)
close(42)

```



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```

close(43)
return
end

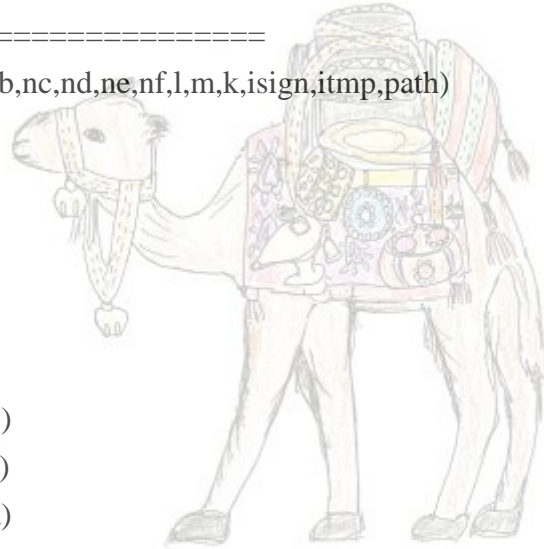
```

!=====

```

subroutine mtr2_2(a,b,nx,na,nb,nc,nd,ne,nf,l,m,k,sign,itmp,path)
real a(nx,nx),b(nx,nx)
character(len=*) path
call openfileo(41,l,path)
call openfileo(42,m,path)
call openfilen(43,k,path)
call openfilen(44,itmp,path)
read(42) ((b(i,j),j=1,ne),i=1,nc)
read(41) ((a(i,j),j=1,nc),i=1,na)
read(41) ((a(i,j),j=1,nd),i=1,na)
read(41) ((a(i,j),j=1,nc),i=1,nb)
call seki (a,b,nx,nb,nc,ne)
rewind 44
write(44) ((a(i,j),j=1,ne),i=1,nb)
read(41) ((b(i,j),j=1,nd),i=1,nb)
backspace 41
backspace 41
read(41) ((a(i,j),j=1,nc),i=1,nb)
read(42) ((b(i,j),j=1,nf),i=1,nc)
call seki (a,b,nx,nb,nc,nf)
write(44) ((a(i,j),j=1,nf),i=1,nb)
read(41) ((a(i,j),j=1,nd),i=1,nb)
read(42) ((b(i,j),j=1,ne),i=1,nd)
call seki (a,b,nx,nb,nd,ne)
rewind 44
read(44) ((b(i,j),j=1,ne),i=1,nb)
call wa (a,b,nx,nb,ne)
if(isign.eq.1) write(43) ((b(i,j),j=1,ne),i=1,nb)
if(isign.eq.-1) write(43) ((-b(i,j),j=1,ne),i=1,nb)
backspace 41
read(41) ((a(i,j),j=1,nd),i=1,nb)
read(42) ((b(i,j),j=1,nf),i=1,nd)
call seki (a,b,nx,nb,nd,nf)
read(44) ((b(i,j),j=1,nf),i=1,nb)

```



戴滿珠寶的駱駝



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```

read(42) ((a(i,j),j=1,ns),i=1,n)
read(42) ((a(i,j),j=1,n ),i=1,ns)
read(42) ((b(i,j),j=1,ns),i=1,ns)
call minvs(b,nx,ns,1e-7,ill)
illd=1
if(ill.ne.0) write (*,10) illd,ill,id
call seki(b,a,nx,ns,ns,n)
write(41) ((b(i,j),j=1,n),i=1,ns)
rewind 42
read(42) ((a(i,j),j=1,n ),i=1,n)
read(42) ((a(i,j),j=1,ns),i=1,n)
call seki (a,b,nx,n,ns,n)
rewind 42
read(42) ((b(i,j),j=1,n ),i=1,n )
call sa (b,a,nx,n,n)
call minvs (a,nx,n,1e-7,ill)
illd=2
if(ill.ne.0) write (*,10) illd,ill,id
rewind 41
read(41) ((b(i,j),j=1,n ),i=1,ns)
call seki (b,a,nx,ns,n,n)
rewind 41
write(41) ((a(i,j),j=1,n ),i=1,n)
write(41) ((-b(i,j),j=1,n ),i=1,ns)
close(42)
close(41)
return
10 format(1x,'ill(',i1,')=' ,i7,' <ID>=#',i2)
end

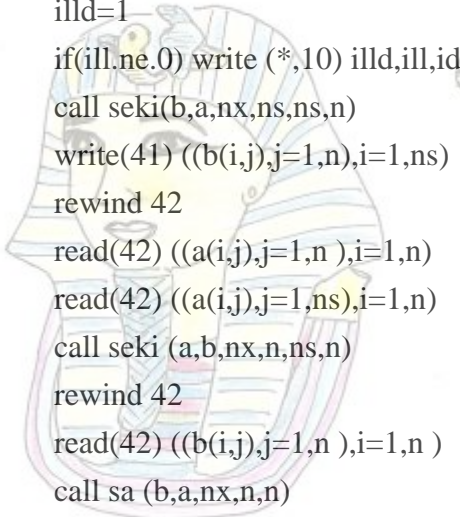
```

!*****

```

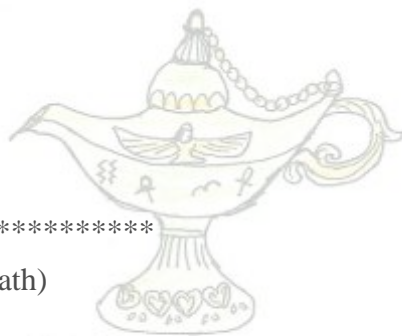
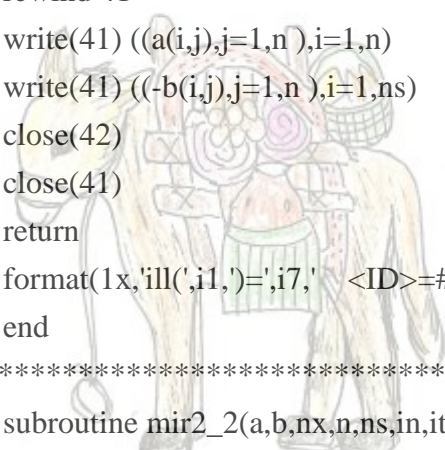
subroutine mir2_2(a,b,nx,n,ns,in,itmp,id,path)
real a(nx,nx),b(nx,nx)
character(len=*) path
call openfilen(41,itmp,path)
call openfileo(42,in,path)
read(42) ((a(i,j),j=1,n ),i=1,n)
call minvs (a,nx,n,1e-7,ill)
illd=3

```



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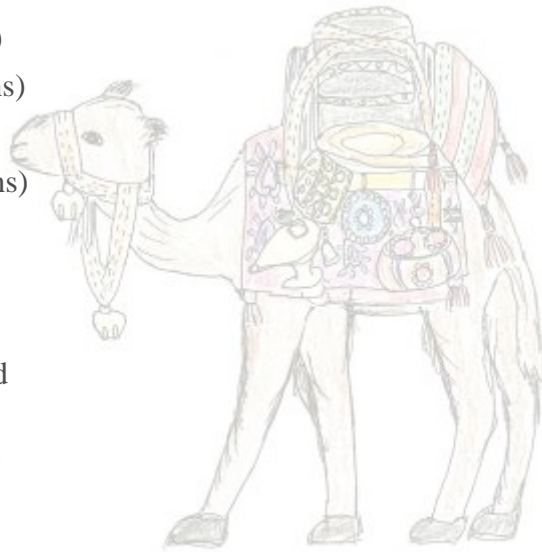


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```

if(ill.ne.0) write(*,10) illd,ill,id
read(42) ((b(i,j),j=1,ns),i=1,n)
call seki (a,b,nx,n,ns)
write(41) ((a(i,j),j=1,ns),i=1,n)
read(42) ((b(i,j),j=1,n),i=1,ns)
call seki (b,a,nx,ns,n,ns)
read(42) ((a(i,j),j=1,ns),i=1,ns)
call sa (a,b,nx,ns,ns)
call minvs (b,nx,ns,1e-7,ill)
illd=4
if(ill.ne.0) write(*,10) illd,ill,id
rewind 41
read(41) ((a(i,j),j=1,ns),i=1,n)
call seki (a,b,nx,n,ns,ns)
rewind 41
write(41) ((-a(i,j),j=1,ns),i=1,n)
write(41) ((b(i,j),j=1,ns),i=1,ns)
close(41)
close(42)
return

```



載滿珠寶的駱駝

```

10 format(1x,'ill(',i1,')=' ,i7,' <ID>=#',i2)
end

```

!*****

```

subroutine mir2_3(a,nx,n,ns,in1,in2,iout,path)
real a(nx,nx)
character(len=*) path
call openfileo(41,in1,path)
call openfileo(42,in2,path)
call openfilen(43,iout,path)
read(41) ((a(i,j),j=1,n),i=1,n)
write(43) ((a(i,j),j=1,n),i=1,n)
read(42) ((a(i,j),j=1,ns),i=1,n)
write(43) ((a(i,j),j=1,ns),i=1,n)
read(41) ((a(i,j),j=1,n),i=1,ns)
write(43) ((a(i,j),j=1,n),i=1,ns)
read(42) ((a(i,j),j=1,ns),i=1,ns)
write(43) ((a(i,j),j=1,ns),i=1,ns)
close(42)

```



阿拉丁神燈


```

case (6)
  n=nn6
  na1=nn5

```

```

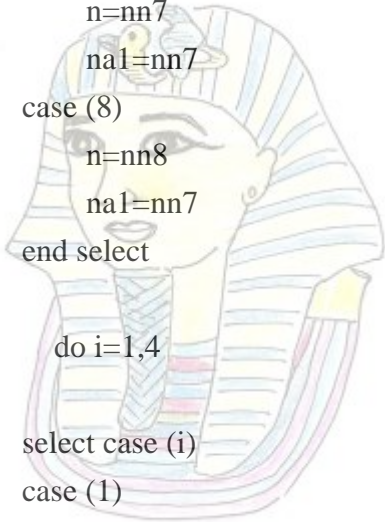
case (7)
  n=nn7
  na1=nn7

```

```

case (8)
  n=nn8
  na1=nn7
end select

```



載滿珠寶的駱駝

```

do i=1,4
select case (i)
case (1)

```

```

  nb1=nn1
  nb2=nn2
  istart1=0
  istart2=nn1

```

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```

case (2)
  nb1=nn3
  nb2=nn4
  istart1=nn1+nn2
  istart2=istart1+nn3

```

```

case (3)
  nb1=nn5
  nb2=nn6
  istart1=nn1+nn2+nn3+nn4
  istart2=istart1+nn5

```

```

case (4)
  nb1=nn7
  nb2=nn8
  istart1=nn1+nn2+nn3+nn4+nn5+nn6
  istart2=istart1+nn7

```

```

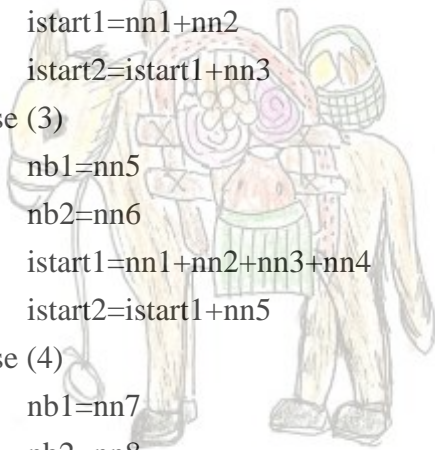
end select

```

```

if(i.eq.1) call openfileo(42,in1,path)
if(i.eq.2) call openfileo(42,in2,path)

```



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```
if(i.eq.3) call openfileo(42,in3,path)
```

```
if(i.eq.4) call openfileo(42,in4,path)
```

```
if((iset/2.-iset/2).eq.0)then
```

```
  read(42) ((hh(ii,jj),jj=1,nb1),ii=1,na1)
```

```
  read(42) ((hh(ii,jj),jj=1,nb2),ii=1,na1)
```

```
end if
```

```
  read(42) ((hh(ii,jj),jj=1,nb1),ii=1,n)
```

```
  if(i.ne.4)then
```

```
    do 11 ii=1,n
```

```
    do 11 jj=1,nb1
```

```
11  f1b(ii)=f1b(ii)+hh(ii,jj)*f1(istart1+jj)
```

```
    read(42) ((hh(ii,jj),jj=1,nb2),ii=1,n)
```

```
    do 13 ii=1,n
```

```
    do 13 jj=1,nb2
```

```
13  f1b(ii)=f1b(ii)+hh(ii,jj)*f1(istart2+jj)
```

```
    else
```

```
    do 15 ii=1,n
```

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```
    do 15 jj=1,nt2
```

```
15  f1b(ii)=f1b(ii)+hh(ii,jj)*f2b(jj)
```

```
end if
```

```
  close(42)
```

```
end do
```

```
call openfilen(46,iout,path)
```

```
write(46) (f1b(i),i=1,n)
```

```
close(46)
```

```
return
```

```
end
```

```
!*****
```

```
subroutine solf1b2(hh,f1,f1b,nx,nt1,nn1,nn2,nn3,nn4,nn5,nn6,
```

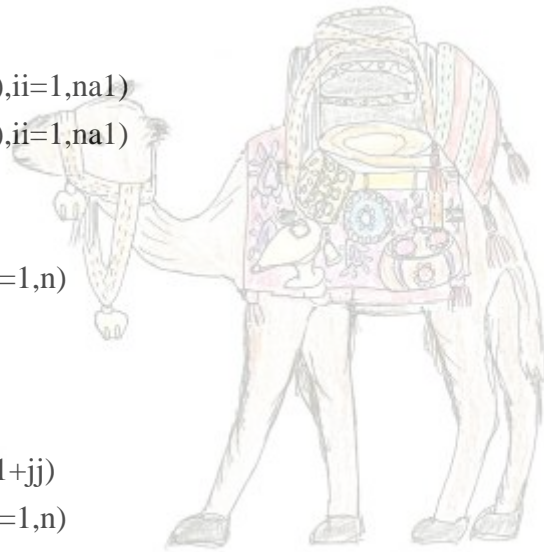
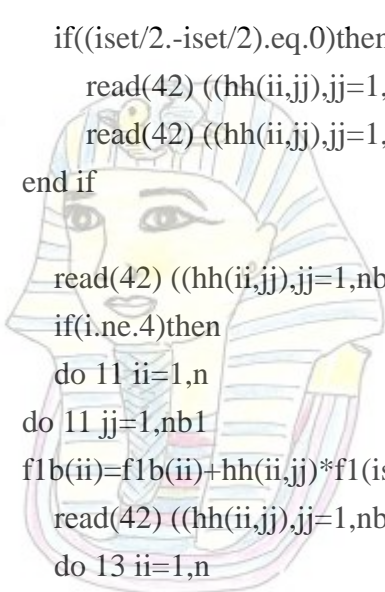
```
& nn7,nn8,iset,in1,in2,in3,in4,if_sta,iout,path)
```

```
  real hh(nx,nx)
```

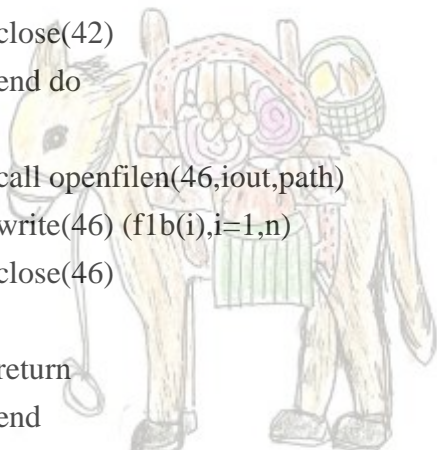
```
  real f1(nt1),f1b(nt1)
```

```
  character(len=*) path
```

```
  do 9 i=1,nt1
```



載滿珠寶的駱駝



9 f1b(i)=0

```
select case (iset)
```

```
case (1)
```

```
  n=nn1
```

```
  na1=nn1
```

```
case (2)
```

```
  n=nn2
```

```
  na1=nn1
```

```
case (3)
```

```
  n=nn3
```

```
  na1=nn3
```

```
  na2=nn4
```

```
case (4)
```

```
  n=nn4
```

```
  na1=nn3
```

```
case (5)
```

```
  n=nn5
```

```
  na1=nn5
```

```
case (6)
```

```
  n=nn6
```

```
  na1=nn5
```

```
case (7)
```

```
  n=nn7
```

```
  na1=nn7
```

```
case (8)
```

```
  n=nn8
```

```
  na1=nn7
```

```
end select
```

```
if_file=if_sta-1
```

```
do i=1,4 載滿貨品的驢子
```

```
select case (i)
```

```
case (1)
```

```
  nb1=nn1
```

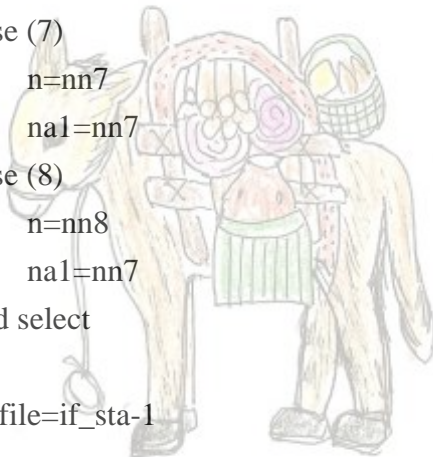
```
  nb2=nn2
```

```
case (2)
```



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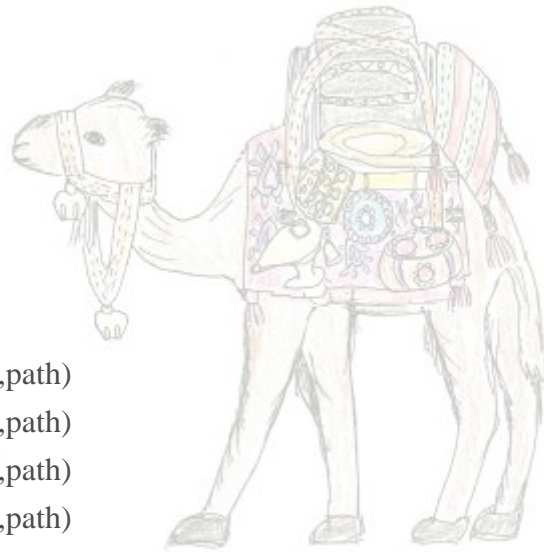
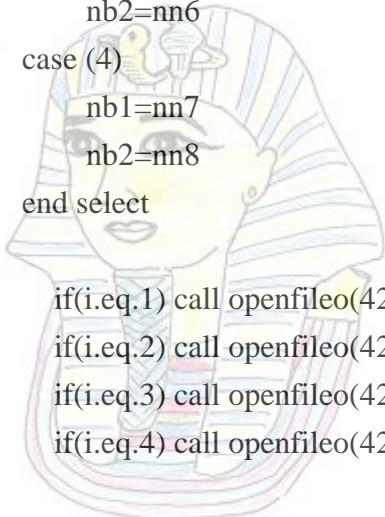


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```

        nb1=nn3
        nb2=nn4
    case (3)
        nb1=nn5
        nb2=nn6
    case (4)
        nb1=nn7
        nb2=nn8
    end select

```



載滿珠寶的駱駝

```

if(i.eq.1) call openfileo(42,in1,path)
if(i.eq.2) call openfileo(42,in2,path)
if(i.eq.3) call openfileo(42,in3,path)
if(i.eq.4) call openfileo(42,in4,path)

if((iset/2.-iset/2).eq.0)then
    read(42) ((hh(ii,jj),jj=1,nb1),ii=1,na1)
    read(42) ((hh(ii,jj),jj=1,nb2),ii=1,na1)
end if

```

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```

read(42) ((hh(ii,jj),jj=1,nb1),ii=1,n)

```

```

if_file=if_file+1
call openfileo(41,if_file,path)
read(41) (f1(ii),ii=1,nb1)
close(41)

```

```

do 11 ii=1,n
do 11 jj=1,nb1

```

```

11 f1b(ii)=f1b(ii)+hh(ii,jj)*f1(jj)

```

```

read(42) ((hh(ii,jj),jj=1,nb2),ii=1,n)

```

載滿貨品的驢子

```

if_file=if_file+1
call openfileo(41,if_file,path)
read(41) (f1(ii),ii=1,nb2)
close(41)

```



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```

do 13 ii=1,n
do 13 jj=1,nb2
13 f1b(ii)=f1b(ii)+hh(ii,jj)*f1(jj)

```

```

close(42)
end do
call openfilen(46,iout,path)
write(46) (f1b(i),i=1,n)
close(46)
return
end

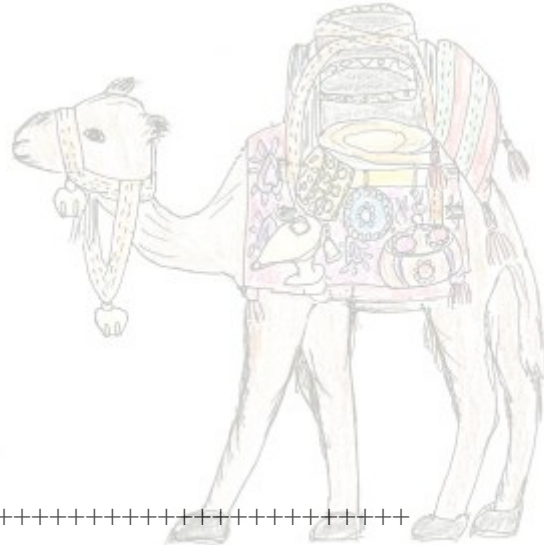
```

!+++++

```

subroutine solf1b3(f1b,nt1,nn1,nn2,nn3,nn4,nn5,nn6,
& if_sta,iout,path)

```



載滿珠寶的駱駝

```

real f1b(nt1)
character(len=*) path
do i=1,6
ifile=if_sta+i-1
select case (i)

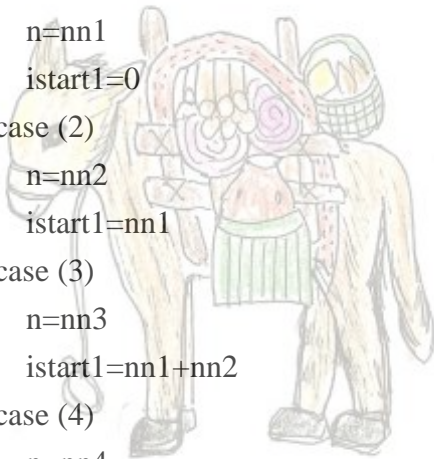
```

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```

case (1)
n=nn1
istart1=0
case (2)
n=nn2
istart1=nn1
case (3)
n=nn3
istart1=nn1+nn2
case (4)
n=nn4
istart1=nn1+nn2+nn3
case (5)
n=nn5
istart1=nn1+nn2+nn3+nn4
case (6)
n=nn6

```



載有寶物的驢子



阿拉丁神燈


```

character*13 tmpname1
character(len=*) path
select case (in)
case (12)
9911 open(unit=1,file=path//tmp/xyz.old',form='unformatted',err=9911,
& status='replace')
if(err.eq.9911) go to 9911
case (13)
9913 open(unit=1,file=path//tmp/f1.old',form='unformatted',err=9913,
& status='replace')
if(err.eq.9913) go to 9913
case (14)
9914 open(unit=1,file=path//tmp/f1b.old',form='unformatted',err=9914,
& status='replace')
if(err.eq.9914) go to 9914
case (15)

```

```

9915 open(unit=1,file=path//tmp/f2b.old',form='unformatted',err=9915,
& status='replace')
if(err.eq.9915) go to 9915
case (51:999)
write(tmpname,"(tmp/',i3.3,'.apt)") in

```

```

8777 open(unit=1,
&file=path//tmpname,form='unformatted',status='replace',err=8777)
if(err.eq.8777) go to 8777
case (10000:99999)
write(tmpname1,"(tmp/',i5.5,'.apt)") in

```

```

8776 open(unit=1,
&file=path//tmpname1,form='unformatted',status='replace',err=8776)
if(err.eq.8776) go to 8776
end select
return
end

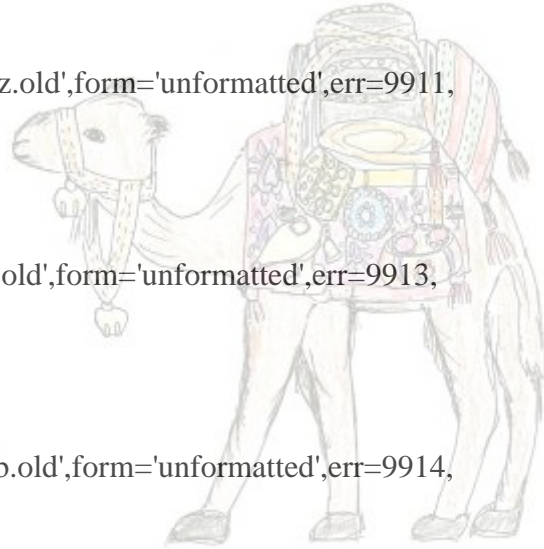
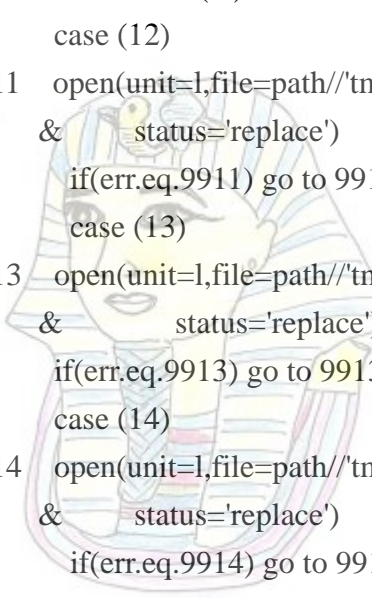
```

===== 戴满珠璣的骆驼 阿拉丁神燈 =====

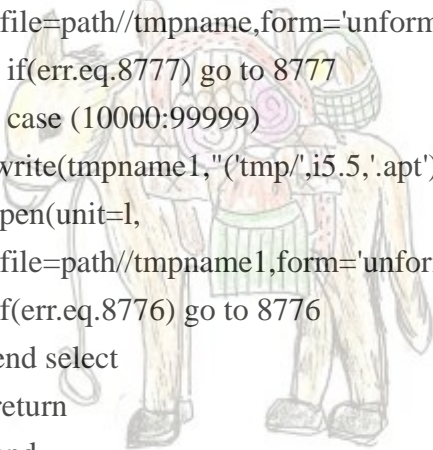
```

subroutine openfileo(l,in,path)
character*11 tmpname
character*13 tmpname1
character(len=*) path
select case (in)

```



戴满珠璣的骆驼



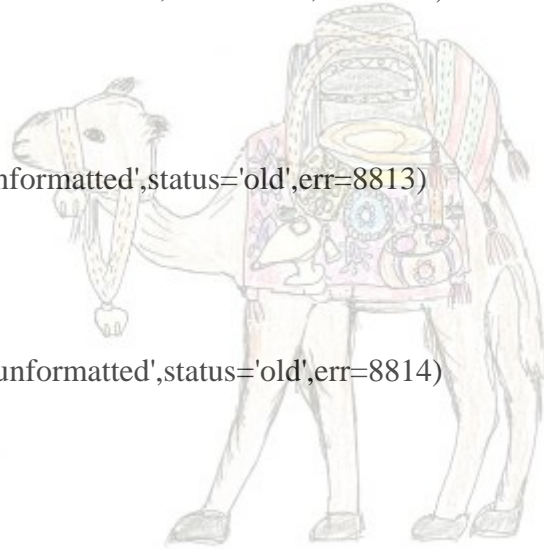
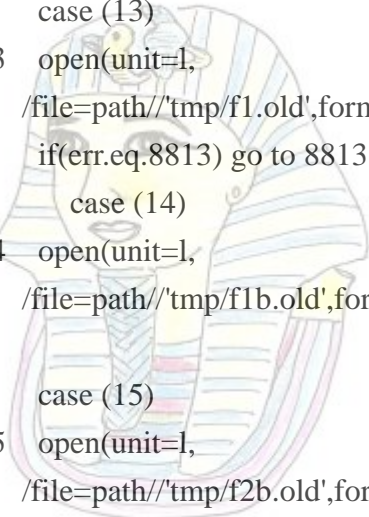
阿拉丁神燈

戴满貨品的馱子

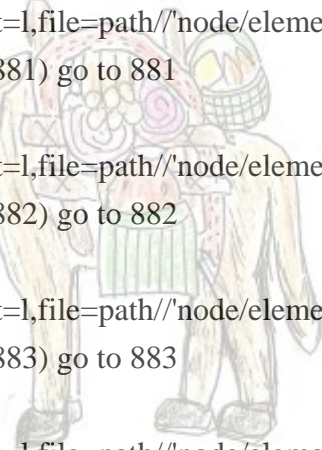
```

case (12)
8812 open(unit=1,
      /file=path//tmp/xyz.old',form='unformatted',status='old',err=8812)
      if(err.eq.8812) go to 8812
      case (13)
8813 open(unit=1,
      /file=path//tmp/f1.old',form='unformatted',status='old',err=8813)
      if(err.eq.8813) go to 8813
      case (14)
8814 open(unit=1,
      /file=path//tmp/f1b.old',form='unformatted',status='old',err=8814)
      case (15)
8815 open(unit=1,
      /file=path//tmp/f2b.old',form='unformatted',status='old',err=8815)
      if(err.eq.8815) go to 8815
      case (51:78)
      write(tmpname, "('tmp/',i3.3, '.apt')") in
88151 open(unit=1,file=path//tmpname,form='unformatted',
      & status='old',err=88151)
      if(err.eq.88151) go to 88151
      case (81)
881 open(unit=1,file=path//node/element_n1.dat',status='old',err=881)
      if(err.eq.881) go to 881
      case (82)
882 open(unit=1,file=path//node/element_n2.dat',status='old',err=882)
      if(err.eq.882) go to 882
      case (83)
883 open(unit=1,file=path//node/element_n3.dat',status='old',err=883)
      if(err.eq.883) go to 883
      case (84)
884 open(unit=1,file=path//node/element_n4.dat',status='old',err=884)
      if(err.eq.884) go to 884
      case (85)
885 open(unit=1,file=path//node/element_n5.dat',status='old',err=885)
      if(err.eq.885) go to 885
      case (86)
886 open(unit=1,file=path//node/element_n6.dat',status='old',err=886)

```



載滿珠寶的駱駝



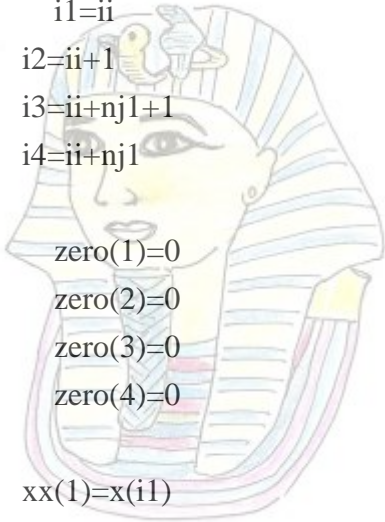
阿拉丁神燈


```
do 10 i=1,ni1-1
do 10 j=1,nj1-1
```

!

```
ii=j+nj1*(i-1)
i1=ii
i2=ii+1
i3=ii+nj1+1
i4=ii+nj1
```

!



```
zero(1)=0
zero(2)=0
zero(3)=0
zero(4)=0
```

!

```
xx(1)=x(i1)
xx(2)=x(i2)
xx(3)=x(i3)
xx(4)=x(i4)
```

!



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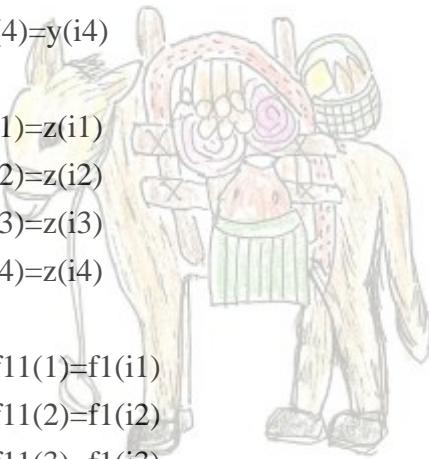
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```
yy(1)=y(i1)
yy(2)=y(i2)
yy(3)=y(i3)
yy(4)=y(i4)
```

!

```
zz(1)=z(i1)
zz(2)=z(i2)
zz(3)=z(i3)
zz(4)=z(i4)
```

!



```
f11(1)=f1(i1)
f11(2)=f1(i2)
f11(3)=f1(i3)
f11(4)=f1(i4)
```

載有寶物的驢子



阿拉丁神燈

!

```
f1bb(1)=f1b(i1)
f1bb(2)=f1b(i2)
f1bb(3)=f1b(i3)
f1bb(4)=f1b(i4)
```

