

v1.2 Mar.2016
Waveguide array
Single

```

subroutine lattice_time_2dtm
!***** lattice widths *****
dl=2.0d-3
dy=dl
dz=dl
!***** number of cells in pml (ncpml) *****
ncpml=8 ! number of cell in pml
tcpml=ncpml*dl ! thickness of pml
!***** sinusoidal frequency *****
freq=2.45d9 ! Hz

```

```

subroutine j_source_2dtm
do j=nint((yi(1)+yi(8))/2.0)-nint(44.0d-3/dy),&
  nint((yi(1)+yi(8))/2.0)-nint(4.0d-3/dy)-1
  k=zi(2)+2
  id=id_ey(j,k)
  ey(j,k)=ey(j,k) &
    -(dt/eps(id))/(1+(sig(id)*dt/(2.0d0*eps(id)))) &
    *(-2.0d0)/sqrt(mu0/eps0)/dz & ! J [A/m2]
    *dsin(2.0d0*pi*freq*(time-dt/2.0d0))
end do

```

```

subroutine media_coeff_2dtm
! id=0 vacume
eps(0)=eps0
sig(0)=0.0d0
mu(0)=mu0
! id=1 pec,pmc (no define, see <e-field> or <h-field> )

```

```

! rectangular media
mys=nint((yi(1)+yi(8))/2.0)-nint(48.0d-3/dy)
mye=nint((yi(1)+yi(8))/2.0)
mzs=zi(1)
mze=nint((zi(1)+zi(8))/2.0)
call rectangular_media_1

```

```

! rectangular media
mys=nint((yi(1)+yi(8))/2.0)-nint(44.0d-3/dy)
mye=nint((yi(1)+yi(8))/2.0)-nint(4.0d-3/dy)
mzs=zi(1)
mze=nint((zi(1)+zi(8))/2.0)
call rectangular_media

```

```

! rectangular media
mys=nint((yi(1)+yi(8))/2.0)
mye=nint((yi(1)+yi(8))/2.0)+nint(48.0d-3/dy)
mzs=zi(1)
mze=nint((zi(1)+zi(8))/2.0)
call rectangular_media_1

```

```

! rectangular media
mys=nint((yi(1)+yi(8))/2.0)+nint(4.0d-3/dy)
mye=nint((yi(1)+yi(8))/2.0)+nint(44.0d-3/dy)
mzs=zi(1)
mze=nint((zi(1)+zi(8))/2.0)
call rectangular_media

```

```

! rectangular media
mys=nint((yi(1)+yi(8))/2.0)-nint(96.0d-3/dy)
mye=nint((yi(1)+yi(8))/2.0)-nint(48.0d-3/dy)
mzs=zi(1)
mze=nint((zi(1)+zi(8))/2.0)
call rectangular_media_1

```

```

! rectangular media
mys=nint((yi(1)+yi(8))/2.0)-nint(92.0d-3/dy)
mye=nint((yi(1)+yi(8))/2.0)-nint(52.0d-3/dy)
mzs=zi(1)
mze=nint((zi(1)+zi(8))/2.0)
call rectangular_media

```

```

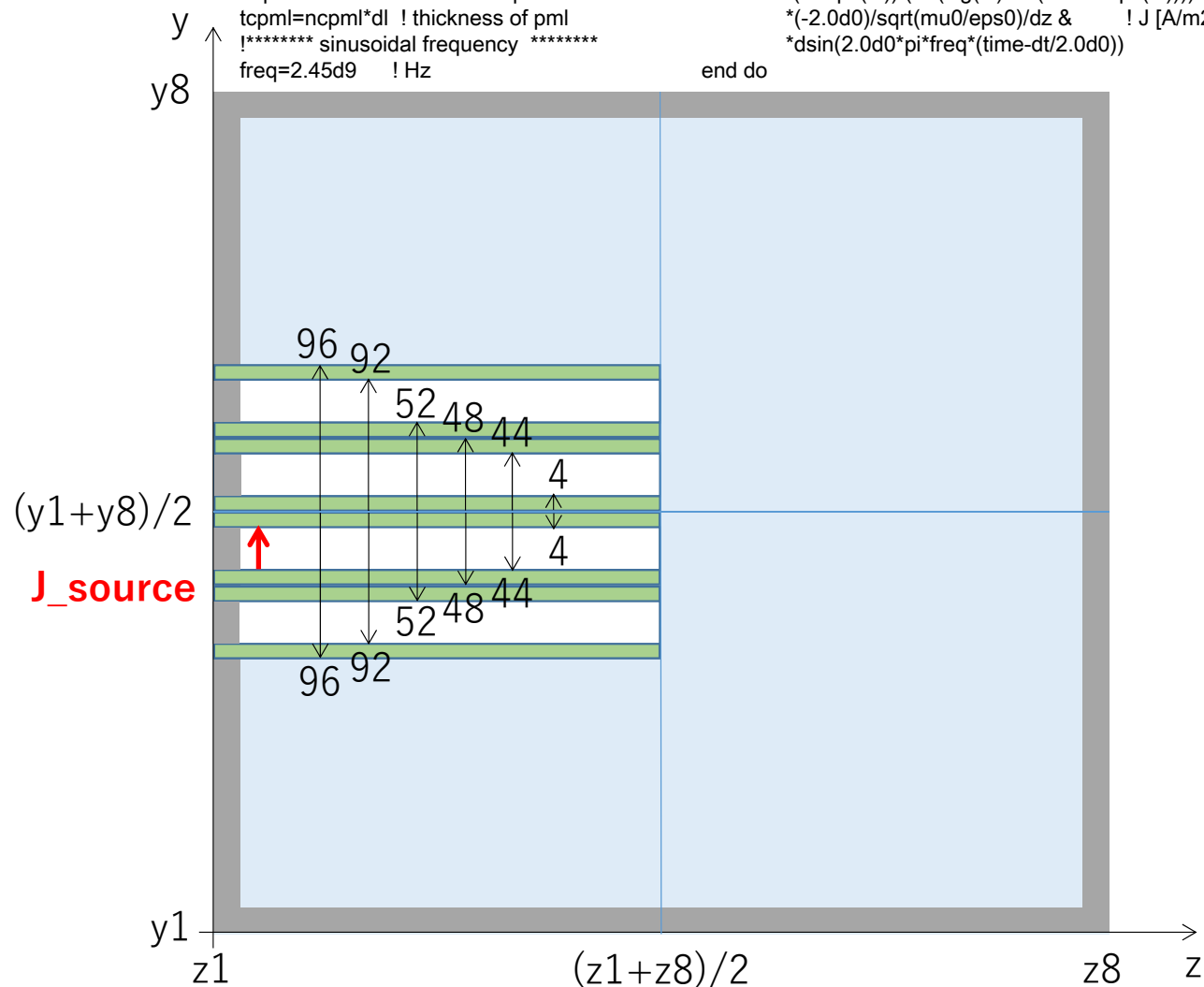
! rectangular media
mys=nint((yi(1)+yi(8))/2.0)+nint(48.0d-3/dy)
mye=nint((yi(1)+yi(8))/2.0)+nint(96.0d-3/dy)
mzs=zi(1)
mze=nint((zi(1)+zi(8))/2.0)
call rectangular_media_1

```

```

! rectangular media
mys=nint((yi(1)+yi(8))/2.0)+nint(52.0d-3/dy)
mye=nint((yi(1)+yi(8))/2.0)+nint(92.0d-3/dy)
mzs=zi(1)
mze=nint((zi(1)+zi(8))/2.0)
call rectangular_media

```



v1.2 Mar.2016
Waveguide array
In-phase

```

subroutine lattice_time_2dtm
!***** lattice widths *****
dl=2.0d-3
dy=dl
dz=dl
!***** number of cells in pml (ncpml) *****
ncpml=8 ! number of cell in pml
tcpml=ncpml*dl ! thickness of pml
!***** sinusoidal frequency *****
freq=2.45d9 ! Hz

```

```

subroutine j_source_2dtm
do j=nint((yi(1)+yi(8))/2.0)-nint(44.0d-3/dy),&
  nint((yi(1)+yi(8))/2.0)-nint(4.0d-3/dy)-1
  k=zi(2)+2
  id=id_ey(j,k)
  ey(j,k)=ey(j,k) &
    -(dt/eps(id))/(1+(sig(id)*dt/(2.0d0*eps(id)))) &
    *(-2.0d0)/sqrt(mu0/eps0)/dz & ! J [A/m2]
    *dsin(2.0d0*pi*freq*(time-dt/2.0d0))
end do

do j=nint((yi(1)+yi(8))/2.0)+nint(4.0d-3/dy),&
  nint((yi(1)+yi(8))/2.0)+nint(44.0d-3/dy)-1
  k=zi(2)+2
  id=id_ey(j,k)
  ey(j,k)=ey(j,k) &
    -(dt/eps(id))/(1+(sig(id)*dt/(2.0d0*eps(id)))) &
    *(-2.0d0)/sqrt(mu0/eps0)/dz & ! J [A/m2]
    *dsin(2.0d0*pi*freq*(time-dt/2.0d0))
end do

do j=nint((yi(1)+yi(8))/2.0)-nint(92.0d-3/dy),&
  nint((yi(1)+yi(8))/2.0)-nint(52.0d-3/dy)-1
  k=zi(2)+2
  id=id_ey(j,k)
  ey(j,k)=ey(j,k) &
    -(dt/eps(id))/(1+(sig(id)*dt/(2.0d0*eps(id)))) &
    *(-2.0d0)/sqrt(mu0/eps0)/dz & ! J [A/m2]
    *dsin(2.0d0*pi*freq*(time-dt/2.0d0))
end do

do j=nint((yi(1)+yi(8))/2.0)+nint(52.0d-3/dy),&
  nint((yi(1)+yi(8))/2.0)+nint(92.0d-3/dy)-1
  k=zi(2)+2
  id=id_ey(j,k)
  ey(j,k)=ey(j,k) &
    -(dt/eps(id))/(1+(sig(id)*dt/(2.0d0*eps(id)))) &
    *(-2.0d0)/sqrt(mu0/eps0)/dz & ! J [A/m2]
    *dsin(2.0d0*pi*freq*(time-dt/2.0d0))
end do

```

```

subroutine media_coeff_2dtm
! id=0 vacume
eps(0)=eps0
sig(0)=0.0d0
mu(0)=mu0
! id=1 pec,pmc (no define, see <e-field> or <h-field> )

! rectangular media
mys=nint((yi(1)+yi(8))/2.0)-nint(48.0d-3/dy)
mye=nint((yi(1)+yi(8))/2.0)
mzs=zi(1)
mze=nint((zi(1)+zi(8))/2.0)
call rectangular_media_1

! rectangular media
mys=nint((yi(1)+yi(8))/2.0)-nint(44.0d-3/dy)
mye=nint((yi(1)+yi(8))/2.0)-nint(4.0d-3/dy)
mzs=zi(1)
mze=nint((zi(1)+zi(8))/2.0)
call rectangular_media

! rectangular media
mys=nint((yi(1)+yi(8))/2.0)
mye=nint((yi(1)+yi(8))/2.0)+nint(48.0d-3/dy)
mzs=zi(1)
mze=nint((zi(1)+zi(8))/2.0)
call rectangular_media_1

! rectangular media
mys=nint((yi(1)+yi(8))/2.0)+nint(4.0d-3/dy)
mye=nint((yi(1)+yi(8))/2.0)+nint(44.0d-3/dy)
mzs=zi(1)
mze=nint((zi(1)+zi(8))/2.0)
call rectangular_media

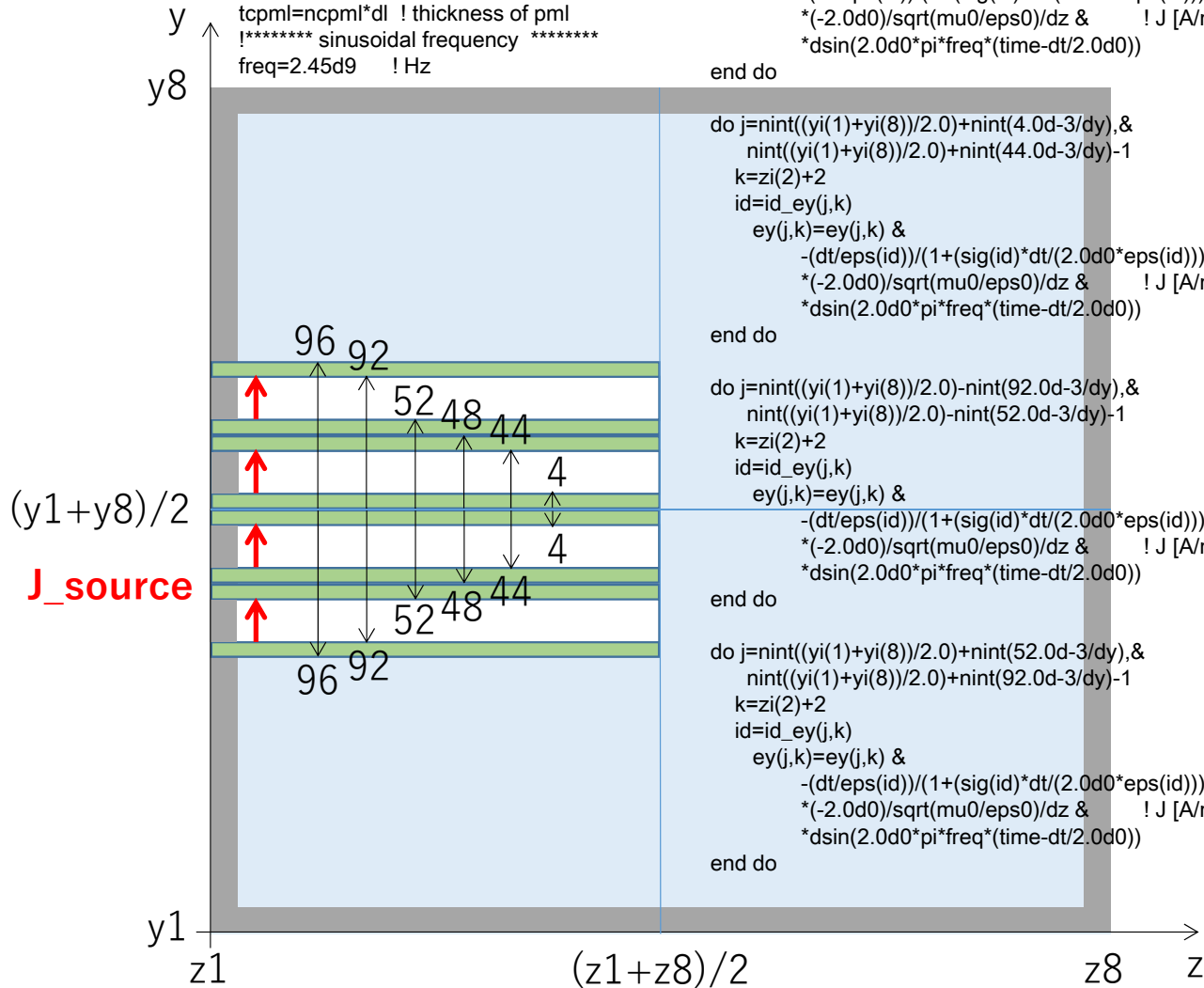
! rectangular media
mys=nint((yi(1)+yi(8))/2.0)-nint(96.0d-3/dy)
mye=nint((yi(1)+yi(8))/2.0)-nint(48.0d-3/dy)
mzs=zi(1)
mze=nint((zi(1)+zi(8))/2.0)
call rectangular_media_1

! rectangular media
mys=nint((yi(1)+yi(8))/2.0)-nint(92.0d-3/dy)
mye=nint((yi(1)+yi(8))/2.0)-nint(52.0d-3/dy)
mzs=zi(1)
mze=nint((zi(1)+zi(8))/2.0)
call rectangular_media

! rectangular media
mys=nint((yi(1)+yi(8))/2.0)+nint(48.0d-3/dy)
mye=nint((yi(1)+yi(8))/2.0)+nint(96.0d-3/dy)
mzs=zi(1)
mze=nint((zi(1)+zi(8))/2.0)
call rectangular_media_1

! rectangular media
mys=nint((yi(1)+yi(8))/2.0)+nint(52.0d-3/dy)
mye=nint((yi(1)+yi(8))/2.0)+nint(92.0d-3/dy)
mzs=zi(1)
mze=nint((zi(1)+zi(8))/2.0)
call rectangular_media

```



v1.2 Mar.2016

Waveguide array
Delay

subroutine lattice_time_2dtm

```
!***** lattice widths *****  
dl=2.0d-3  
dy=dl  
dz=dl  
!***** number of cells in pml (ncpml) *****  
ncpml=8 ! number of cell in pml  
tcpml=ncpml*dl ! thickness of pml  
!***** sinusoidal frequency *****  
freq=2.45d9 ! Hz
```

subroutine j_source_2dtm

```
do j=nint((yi(1)+yi(8))/2.0)-nint(92.0d-3/dy),&  
  nint((yi(1)+yi(8))/2.0)-nint(52.0d-3/dy)-1  
  k=zi(2)+2  
  id=id_ey(j,k)  
  ey(j,k)=ey(j,k) &  
    -(dt/eps(id))/(1+(sig(id)*dt/(2.0d0*eps(id)))) &  
    *(-2.0d0)/sqrt(mu0/eps0)/dz & ! J [A/m2]  
    *dsin(2.0d0*pi*freq*(time-dt/2.0d0)-pi/4.0d0)  
end do
```

subroutine media_coeff_2dtm

```
! id=0 vacume  
eps(0)=eps0  
sig(0)=0.0d0  
mu(0)=mu0  
! id=1 pec,pmc (no define, see <e-field> or <h-field> )
```

```
! rectangular media  
mys=nint((yi(1)+yi(8))/2.0)-nint(48.0d-3/dy)  
mye=nint((yi(1)+yi(8))/2.0)  
mzs=zi(1)  
mze=nint((zi(1)+zi(8))/2.0)  
call rectangular_media_1
```

```
! rectangular media  
mys=nint((yi(1)+yi(8))/2.0)-nint(44.0d-3/dy)  
mye=nint((yi(1)+yi(8))/2.0)-nint(4.0d-3/dy)  
mzs=zi(1)  
mze=nint((zi(1)+zi(8))/2.0)  
call rectangular_media
```

```
! rectangular media  
mys=nint((yi(1)+yi(8))/2.0)  
mye=nint((yi(1)+yi(8))/2.0)+nint(48.0d-3/dy)  
mzs=zi(1)  
mze=nint((zi(1)+zi(8))/2.0)  
call rectangular_media_1
```

```
! rectangular media  
mys=nint((yi(1)+yi(8))/2.0)+nint(4.0d-3/dy)  
mye=nint((yi(1)+yi(8))/2.0)+nint(44.0d-3/dy)  
mzs=zi(1)  
mze=nint((zi(1)+zi(8))/2.0)  
call rectangular_media
```

```
! rectangular media  
mys=nint((yi(1)+yi(8))/2.0)-nint(96.0d-3/dy)  
mye=nint((yi(1)+yi(8))/2.0)-nint(48.0d-3/dy)  
mzs=zi(1)  
mze=nint((zi(1)+zi(8))/2.0)  
call rectangular_media_1
```

```
! rectangular media  
mys=nint((yi(1)+yi(8))/2.0)-nint(92.0d-3/dy)  
mye=nint((yi(1)+yi(8))/2.0)-nint(52.0d-3/dy)  
mzs=zi(1)  
mze=nint((zi(1)+zi(8))/2.0)  
call rectangular_media
```

```
! rectangular media  
mys=nint((yi(1)+yi(8))/2.0)+nint(48.0d-3/dy)  
mye=nint((yi(1)+yi(8))/2.0)+nint(96.0d-3/dy)  
mzs=zi(1)  
mze=nint((zi(1)+zi(8))/2.0)  
call rectangular_media_1
```

```
! rectangular media  
mys=nint((yi(1)+yi(8))/2.0)+nint(52.0d-3/dy)  
mye=nint((yi(1)+yi(8))/2.0)+nint(92.0d-3/dy)  
mzs=zi(1)  
mze=nint((zi(1)+zi(8))/2.0)  
call rectangular_media
```

