

# Visualize results of FD modeling

## Introduction

This script plots snapshots of the wavefield generated by FD code.

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## Add MLIB library

```
clear; close all; clc;
mllibfolder = '/home/ivan/Desktop/MLIB';
path(path, mllibfolder);
add_mlib_path;
```

## Set parameters of FD modeling

```
folder = [mllibfolder '/Examples/Heidimod/s90900/'];
vp = 4000; % velocity of P-wave
vs = 2350; % velocity of S-wave
rho = 3000; % dencity
ns = 130; % number of time samples
nts = 20; % number of time samples of the wavelet
dt = 0.002; % time step
nrec = 8; % number of receivers
f = 40; % dominant frequency
```

## Make G-file

```
G=GridClass;

% [m]      [m]      [m]      [s]
G.x0=0;    G.y0=0;    G.z0=0;    G.t0 = 0.00; % initial point
G.nx=102;   G.ny=103;   G.nz=101;   G.nt = ns; % grid size
G.dx=10;    G.dy=10;    G.dz=10;    G.dt = dt; % grid step (meter)

G.gridInfo;
```

```
Information about grid:
x0=0, dx=10, Nx=102.
y0=0, dy=10, Ny=103.
z0=0, dz=10, Nz=101.
t0=0, dt=0.002, Nt=130.
```

```
G.setGrid;  
Gold = oldGrid(G);
```

## Read results of FD modeling: source and receiver positions

```
fid = fopen([folder 'slocation'], 'r');  
sloc = fread(fid, inf, 'single', 'ieee-be');  
fclose(fid);  
  
fid = fopen([folder 'geoloc'], 'r');  
gloc = fread(fid, inf, 'single', 'ieee-be');  
fclose(fid);  
gloc = reshape(gloc, [3, nrec]);  
  
acq.gsx = sloc(2, :);  
acq.gsy = sloc(3, :);  
acq.gsz = sloc(1, :);  
acq.grx = gloc(2, :);  
acq.gry = gloc(3, :);  
acq.grz = gloc(1, :);  
acq.sx = G.x0 + (acq.gsx-1)*G.dx;  
acq.sy = G.y0 + (acq.gsy-1)*G.dy;  
acq.sz = G.z0 + (acq.gsz-1)*G.dz;  
acq.rx = G.x0 + (acq.grx-1)*G.dx;  
acq.ry = G.y0 + (acq.gry-1)*G.dy;  
acq.rz = G.z0 + (acq.grz-1)*G.dz;  
  
clear sloc gloc
```

## Read results of FD modeling - snapshots

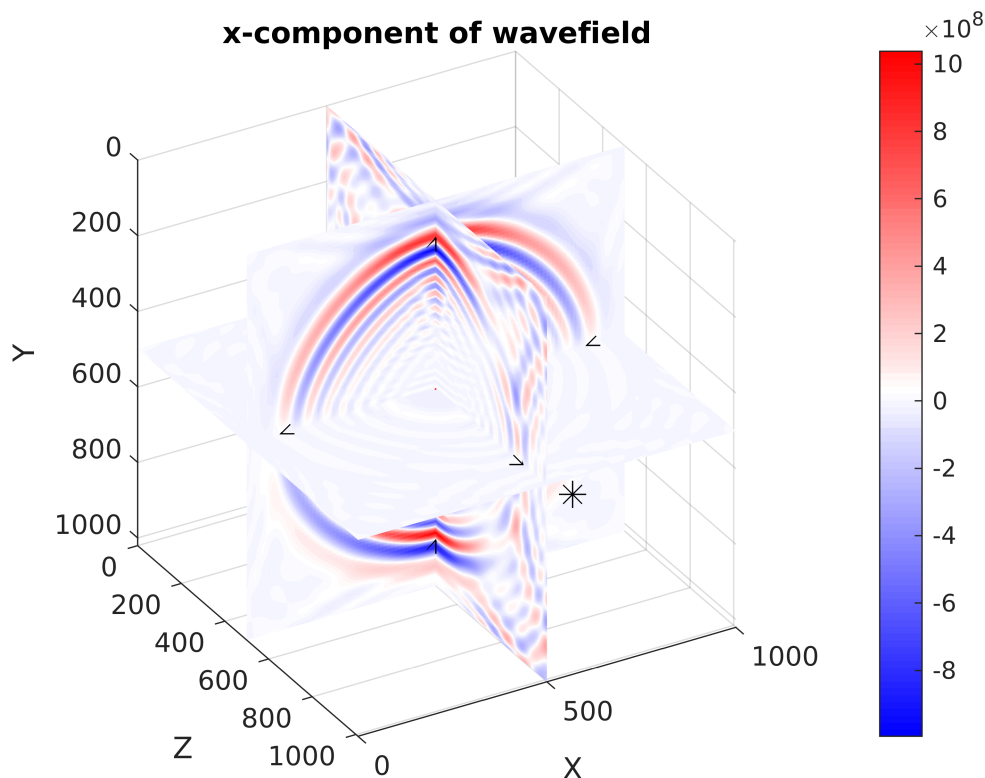
```
fid = fopen([folder 'xsnap'], 'r');  
datax = fread(fid, inf, 'single', 'ieee-be');  
fclose(fid);  
datax = reshape(datax, [G.nz G.nx G.ny 1]);  
  
fid = fopen([folder 'ysnap'], 'r');  
datay = fread(fid, inf, 'single', 'ieee-be');  
fclose(fid);  
datay = reshape(datay, [G.nz G.nx G.ny 1]);  
  
fid = fopen([folder 'zsnap'], 'r');  
dataz = fread(fid, inf, 'single', 'ieee-be');  
fclose(fid);  
dataz = reshape(dataz, [G.nz G.nx G.ny 1]);
```

## Plot x-component of the wavefield

```

figure(1)
h=slice(G.xx,G.zz,G.yy,datax,acq.sx,acq.sz,acq.sy);
hold on
plot3(acq.rz, acq.rx, acq.ry, 'k*', 'MarkerSize', 10);
plot3(acq.sz, acq.sx, acq.sy, 'r*', 'MarkerSize', 10);
set(h,'FaceColor','interp','EdgeColor','none','DiffuseStrength',.8)
xlabel('Z')
ylabel('X')
zlabel('Y')
axis ([G.x0 G.mx G.z0 G.mz G.y0 G.my]);
set(gca,'Zdir','reverse'); axis image;
view(60,30);
title('x-component of wavefield')
colorbar;
colormap(makeColorMap([0 0 1],[1 1 1],[1 0 0],100));

```



## Plot y-component of the wavefield

```

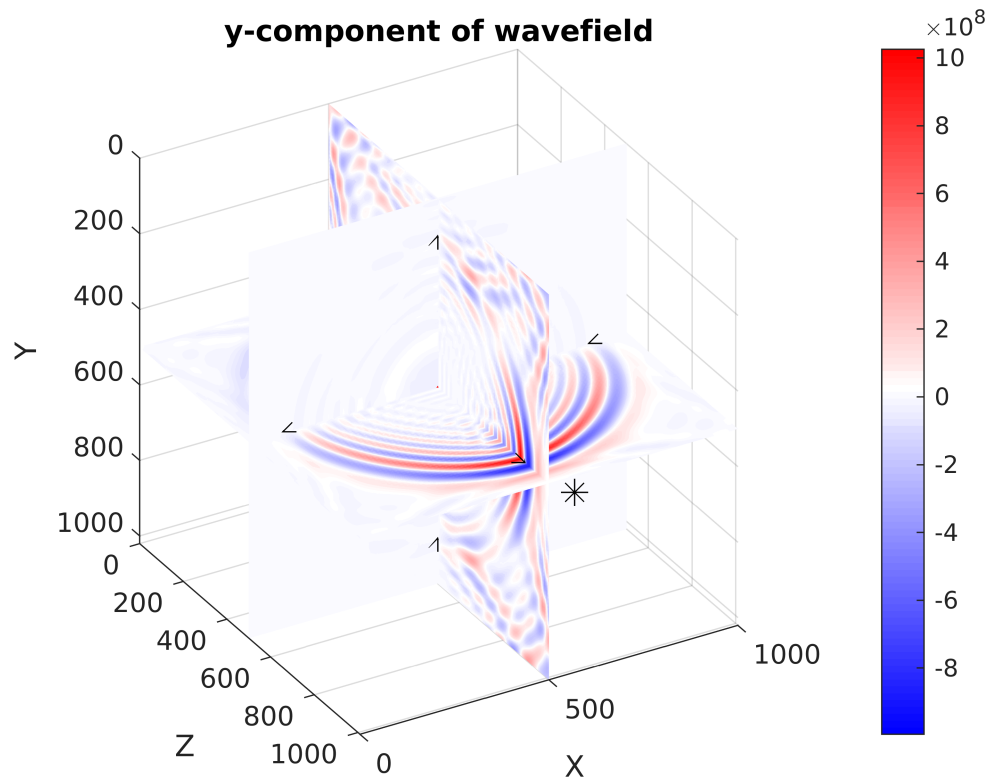
figure(2)
h=slice(G.xx,G.zz,G.yy,datax,acq.sx,acq.sz,acq.sy);
hold on
plot3(acq.rz, acq.rx, acq.ry, 'k*', 'MarkerSize', 10);
plot3(acq.sz, acq.sx, acq.sy, 'r*', 'MarkerSize', 10);
set(h,'FaceColor','interp','EdgeColor','none','DiffuseStrength',.8)
xlabel('Z')
ylabel('X')

```

```

xlabel('Y')
axis ([G.x0 G.mx G.z0 G.mz G.y0 G.my]);
set(gca,'Zdir','reverse'); axis image;
view(60,30);
title('y-component of wavefield')
colorbar;
colormap(makeColorMap([0 0 1],[1 1 1],[1 0 0],100));

```



## Plot z-component of the wavefield

```

figure(3)
h=slice(G.xx,G.zz,G.yy,dataz,acq.sx,acq.sz,acq.sy);
hold on
plot3(acq.rz, acq.rx, acq.ry, 'k*', 'MarkerSize', 10);
plot3(acq.sz, acq.sx, acq.sy, 'r*', 'MarkerSize', 10);
set(h,'FaceColor','interp','EdgeColor','none','DiffuseStrength',.8)
xlabel('Z')
ylabel('X')
zlabel('Y')
axis ([G.x0 G.mx G.z0 G.mz G.y0 G.my]);
set(gca,'Zdir','reverse'); axis image;
view(60,30);
title('z-component of wavefield')
colorbar;
colormap(makeColorMap([0 0 1],[1 1 1],[1 0 0],100));

```

