Contents

- Impulse setup
- pressure response from x=-15mm to x=15mm, depth 5~150mm


```
close all;
clear all;

no_elements = 64;
pitch = 0.29e-3;
kerf = 0.025e-3;
width = pitch - kerf;
height=13e-3;
no_sub_x = 5;
no_sub_y = 30;
focus = [0 0 60]/1000;
Rfocus = 60e-3;
c =1540;

field_init(0);

Th = xdc_focused_array(no_elements, width, height, kerf, Rfocus, no_sub_x, no_sub_y, focus
);
figure;
show_xdc_geir(Th, 1);
axis equal;
view(3);

%
fs = 100e6; %sampling freq (100Mhz)
f0 = 2.5e6; % transducer center freq (2.5Mhz)
t0 = 1/f0;
dt = 1/fs;  %sampling period
set_sampling(fs);
```

```
      *---------------------------------------------------------*
      *                                                         *
      *                      F I E L D   I I                    *
      *                                                         *
      *              Simulator for ultrasound systems           *
      *                                                         *
      *             Copyright by Joergen Arendt Jensen          *
      *    Version 3.24, May 12, 2014 (Matlab 8.20 version)     *
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      *     This is citationware. Note the terms and conditions *
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      *               field-ii.dk/?copyright.html               *
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      *  copyright statement is not followed.                   *
      *---------------------------------------------------------*
Read rectangular data for plotting....
Plots aperture with physical element number...
Warning:  Remember to set all pulses in apertures for the new sampling frequency
```
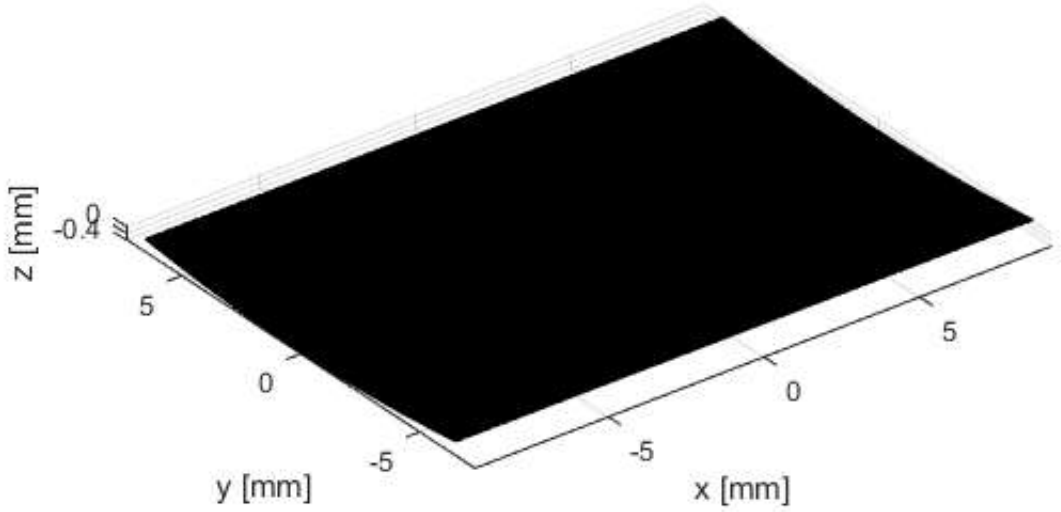
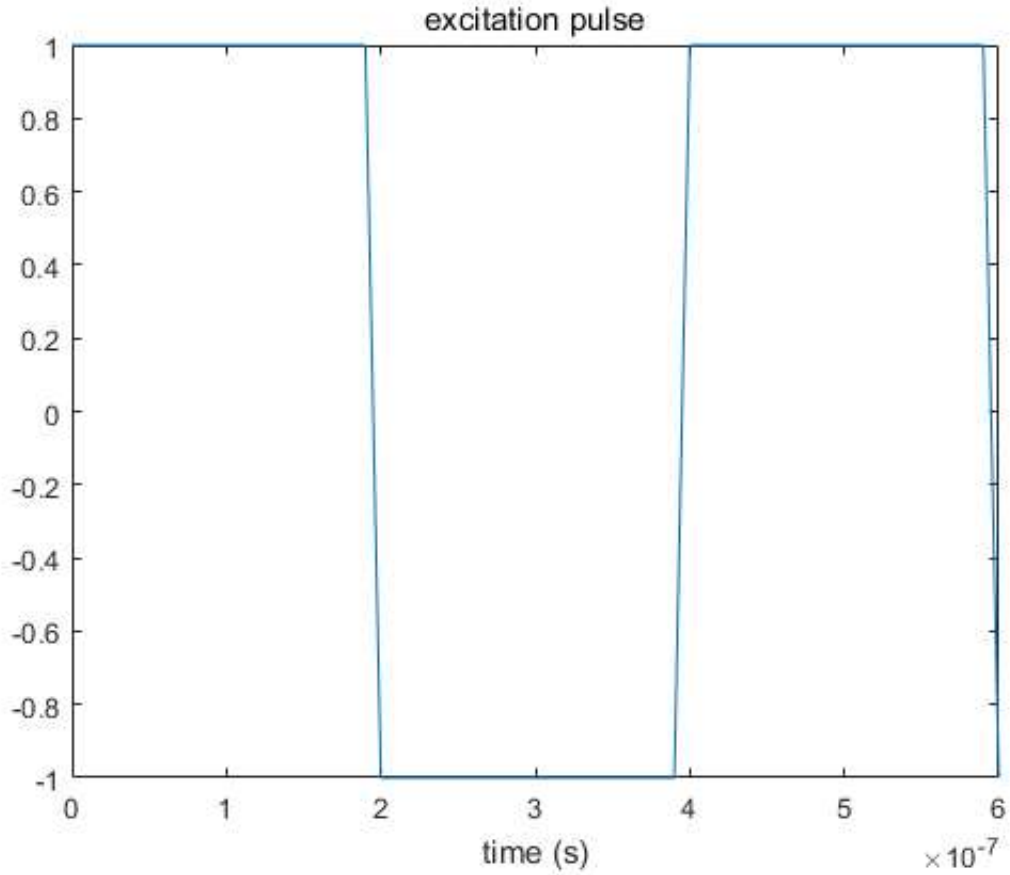
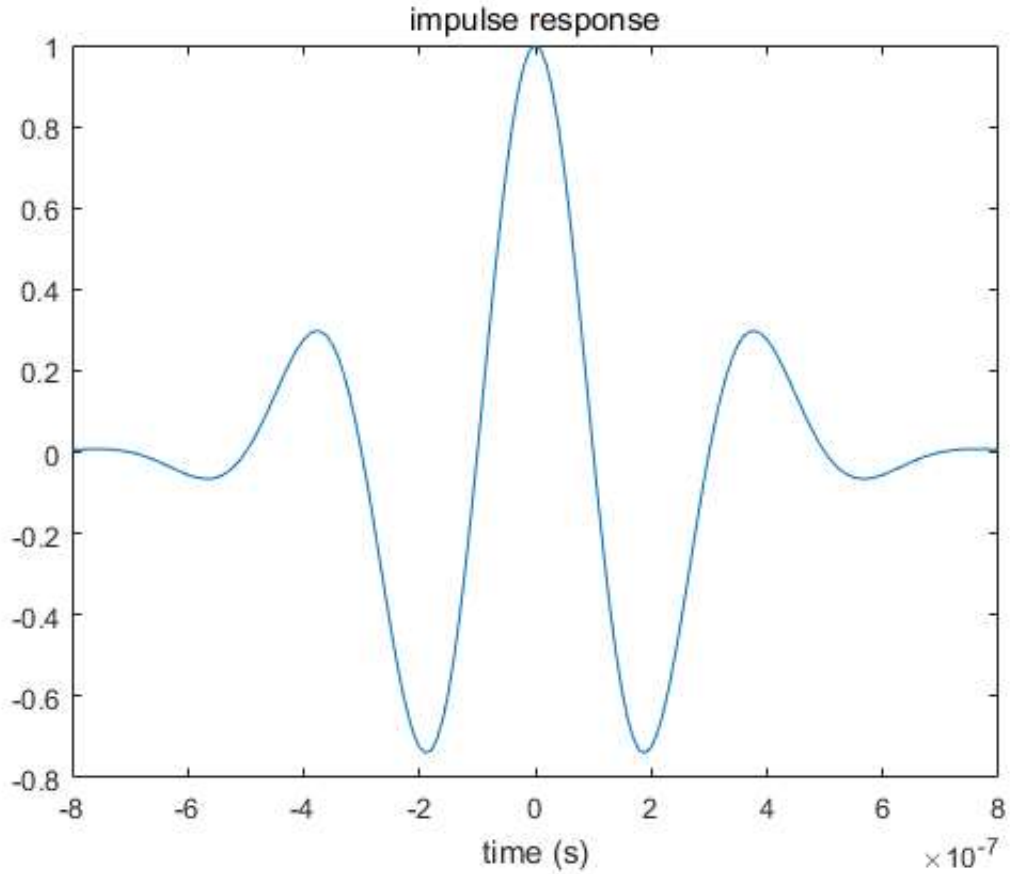
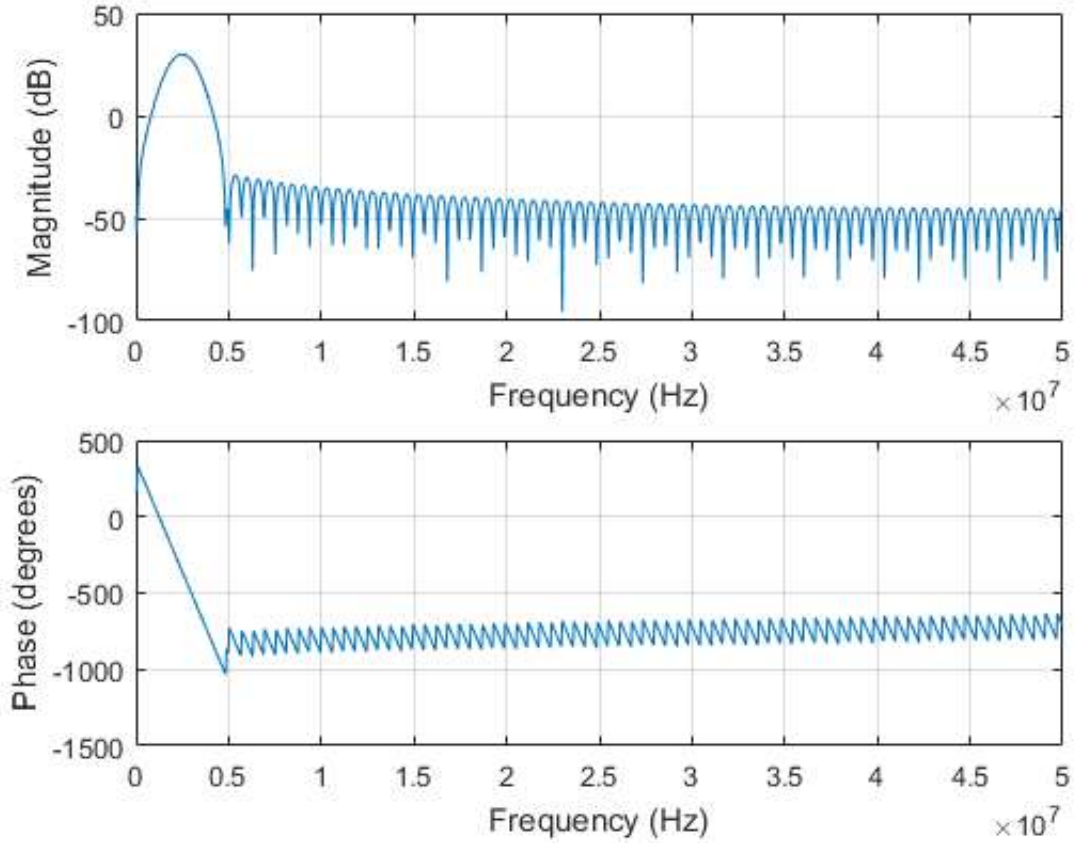



Impulse setup

```
t_ir = -2/f0:1/fs:2/f0;
Bw = 0.6;
impulse_response = gauspuls(t_ir, f0, Bw);
xdc_impulse (Th, impulse_response);
figure;
excitation = square(2*pi*f0*(0:dt:1.5*t0));
plot(0:dt:1.5*t0, excitation);
xlabel("time (s)");
title("excitation pulse");
xdc_excitation(Th, excitation);
figure;
plot(t_ir, impulse_response);
xlabel("time (s)");
title("impulse response");
figure;
freqz(impulse_response,1,1024,fs);
```


excitation pulse
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
0
1
2
3
4
5
6
time (s)
×10^-7

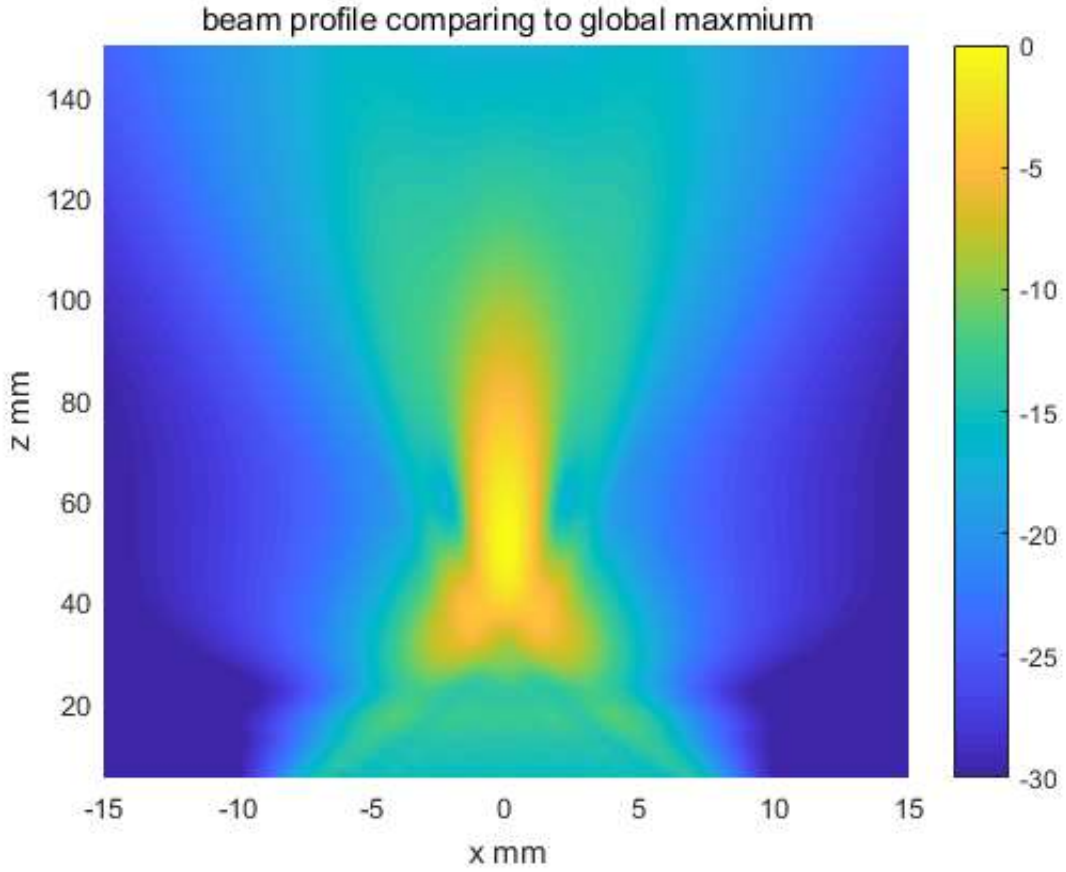

impulse response
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-8
-6
-4
-2
0
2
4
6
8
time (s)
×10^-7

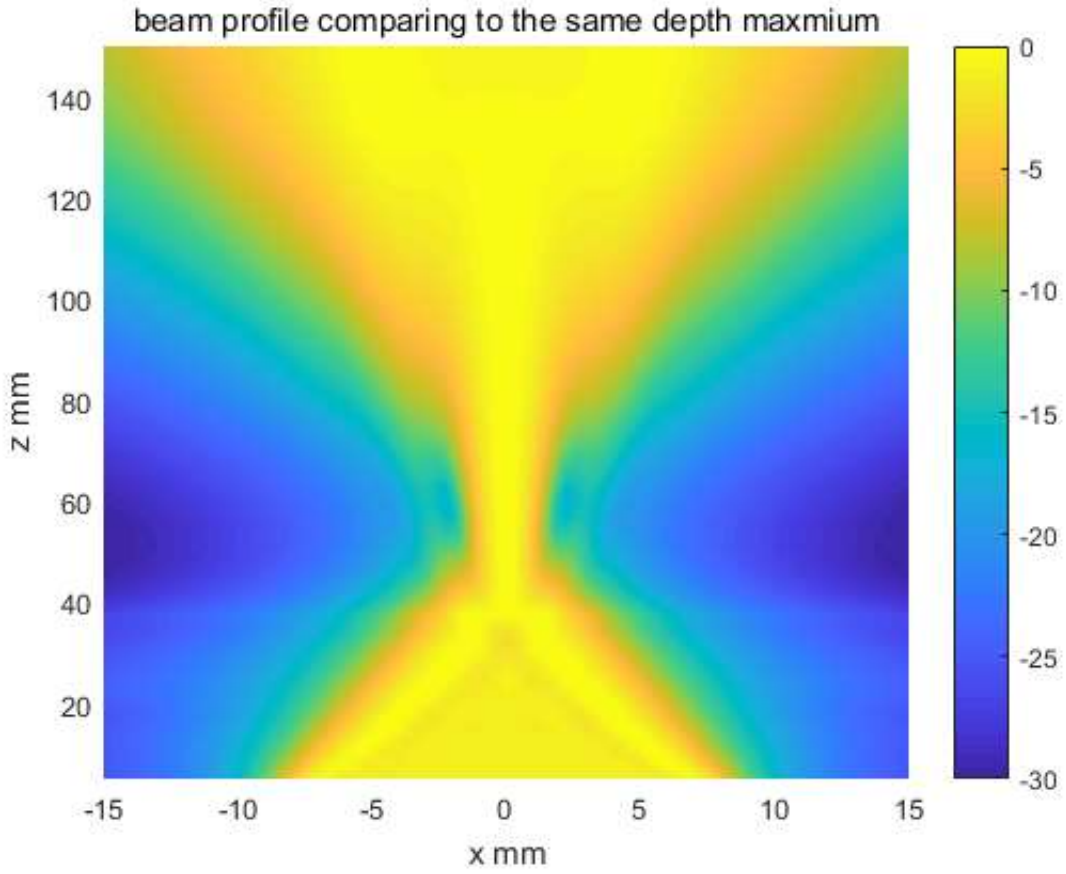


pressure response from x=-15mm to x=15mm, depth 5~150mm

```
Nx = 81; Nz = 59;
x0=linspace(-15e-3,15e-3,Nx);
z0=linspace( 5e-3,150e-3,Nz);
[X,Z]=meshgrid(x0,z0);
measure_point = [X(:), zeros(length(X(:)),1),Z(:)];
[hp_x0, t_start]=calc_hp(Th, measure_point);
figure;
tAx_hp = t_start+(0:length(hp_x0)-1)/fs;
rms_hp_x0 = rms(hp_x0);
rms_hp_x0 = rms_hp_x0/max(rms_hp_x0);
BPmatrix = reshape(rms_hp_x0,Nz,Nx);
pcolor(x0*1000,z0*1000,20*log10(BPmatrix));
shading interp
colorbar;
caxis([-30 0]);
xlabel("x mm");
ylabel("z mm");
title("beam profile comparing to global maxmium");

figure;
BPmatrix = rms(hp_x0);
BPmatrix = reshape(BPmatrix,Nz,Nx);
BPmatrix= BPmatrix./repmat(max(BPmatrix')', 1,Nx);
pcolor(x0*1000,z0*1000,20*log10(BPmatrix));
shading interp
colorbar;
caxis([-30 0]);
xlabel("x mm");
ylabel("z mm");
title("beam profile comparing to the same depth maxmium");
```

3 seconds used for the calculation





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