MatLab Code Publish

*Figures are for final result, see Additional Data for figures of other tries


```
% plotMrmRetLog.m
% This script prompts the user for a MRM-RET logfile, reads, parses, and
% produces a "waterfall plot" of the motion filtered scans and detection lists
% in the logfile
clear all; close all; clc
```

Query user for logfile

```
%dnm = '.'; fnm = 'MRM_002.csv';
[fnmb,dnmb] = uigetfile('*.csv');
fprintf('Reading logfile %s\n',fullfile(dnmb,fnmb));
[cfgb,reqb,scnb,det] = readMrmRetLog(fullfile(dnmb,fnmb));

[fnmt,dnmt] = uigetfile('*.csv');
fprintf('Reading logfile %s\n',fullfile(dnmt,fnmt));
[cfgt,reqt,scnt,dett] = readMrmRetLog(fullfile(dnmt,fnmt));
```

```
Reading logfile
C:\Users\tonka\OneDrive\Documents\MATLAB\384_Lab\cw8_scans\cw8_scans\RetLog_Background006.csv
Reading logfile
C:\Users\tonka\OneDrive\Documents\MATLAB\384_Lab\cw8_scans\cw8_scans\RetLog_Target007.csv
```

Separate raw, bandpassed, and motion filtered data from scn structure

(only motion filtered is used)

Pull out the raw scans (if saved)

```
rawscansI = find([scnb.Nfilt] == 1);
rawscansV_background = reshape([scnb(rawscansI).scn],[],length(rawscansI))';

rawscansI1 = find([scnt.Nfilt] == 1);
rawscansV_target = reshape([scnt(rawscansI1).scn],[],length(rawscansI1))';

scan_difference = abs(rawscansV_background(1:10,:) - rawscansV_target(1:10,:));
```

Create the waterfall horizontal and vertical axes

```
Tbin = 32/(512*1.024);  % ns
T0 = 0; % ns
c = 0.29979;  % m/ns
Rbin = c*(Tbin*(0:size(scan_difference(1,:),2)-1) - T0)/2;% Range Bins in meters

rbin = 90;
%Background plot
figure; plot(Rbin,rawscansV_background(10,:))
%Taget plot
figure; plot(Rbin,rawscansV_target(10,:))
% Difference plot
figure;plot(Rbin,scan_difference(10,:))


[a,i]=max(scan_difference(10,:));
distance=Rbin(i)
```

```
distance =

    1.0613
```

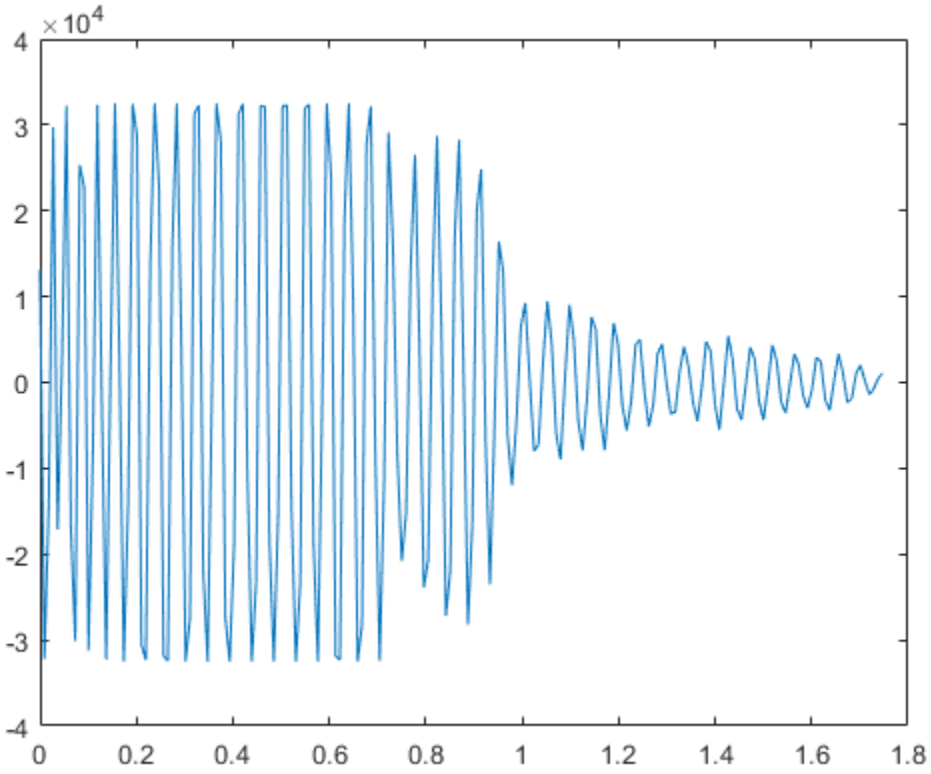

Figure 1. Background Scan

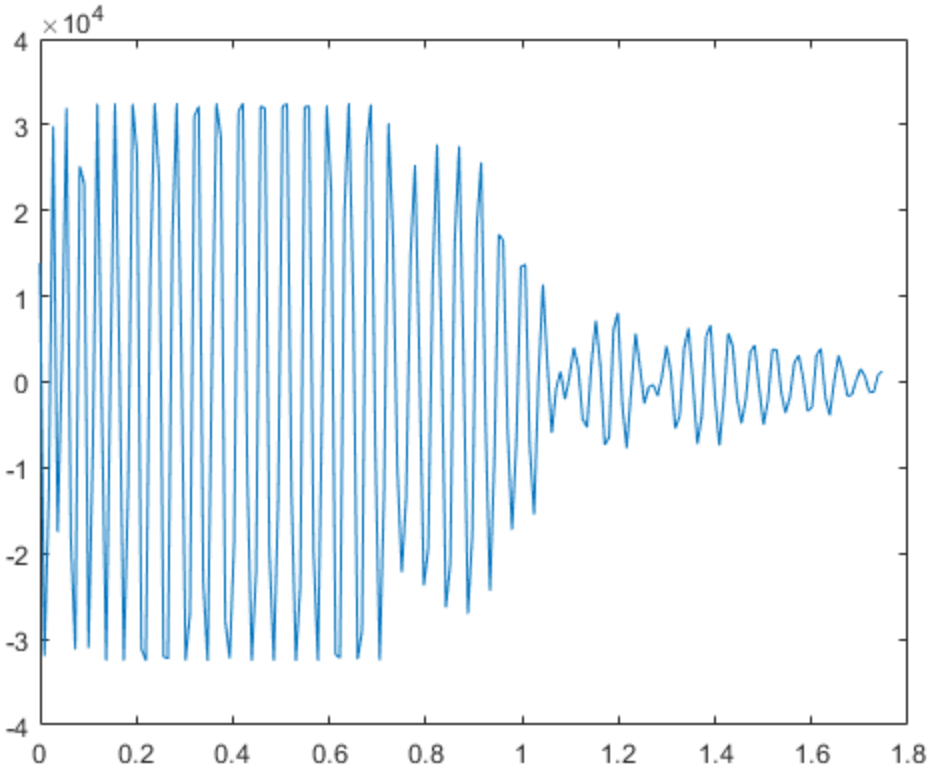

Figure 2. Target Scan

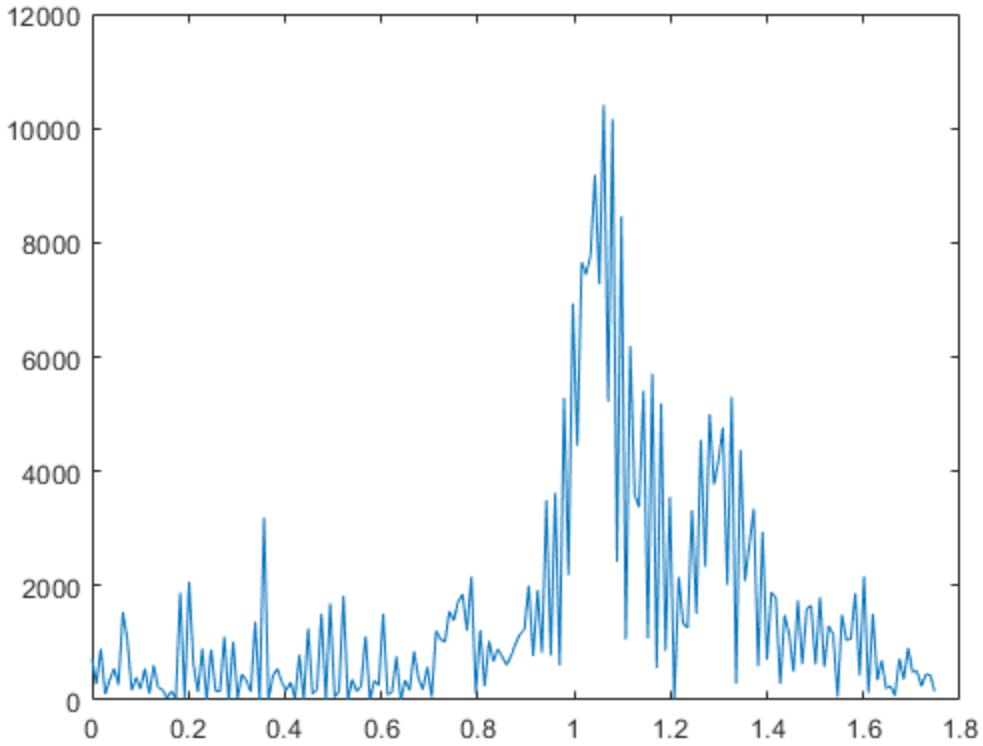

Figure 3. Difference Scan

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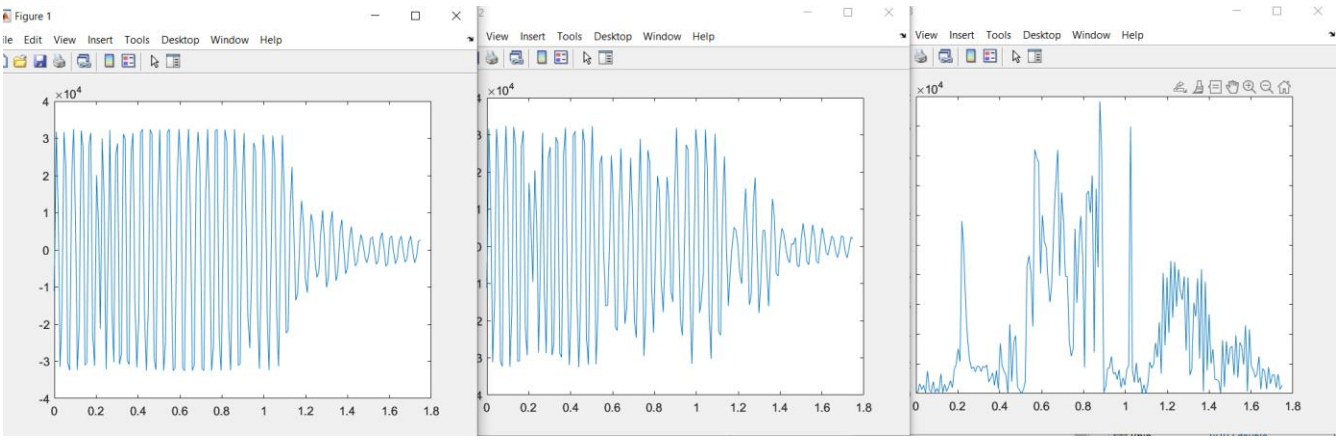
Additional Data

- 4a
    - R = (c*tau)/2
    - 2 = (c*tau)/2
    - 1/c = tau
    - A scan should last 0.33 ms or 1/c. C being the speed of light
- 4c
    - Start: 11189
    - Stop: 22908

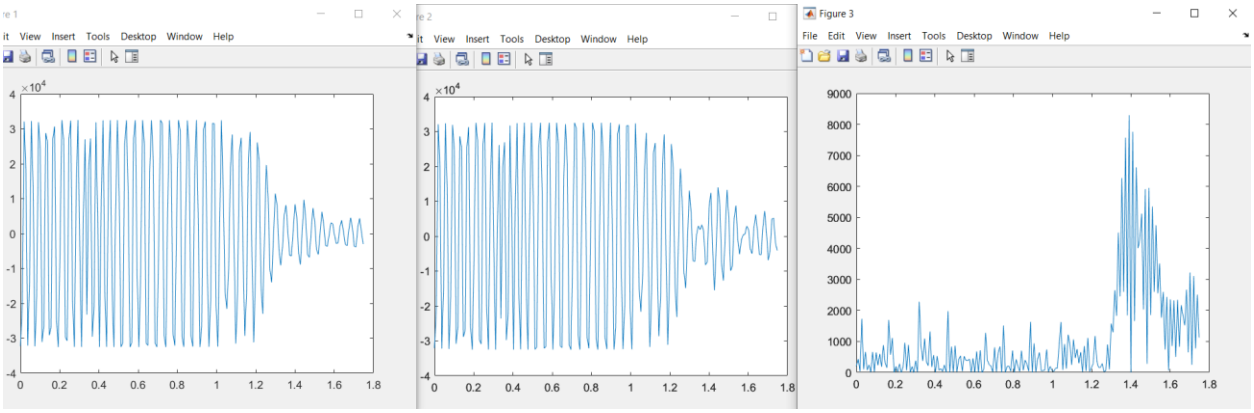
Scanning Tries/Data

- Try 1:
    - Start Time: 10000
    - Stop Time: 21718
    - Measured distance = 0.8783

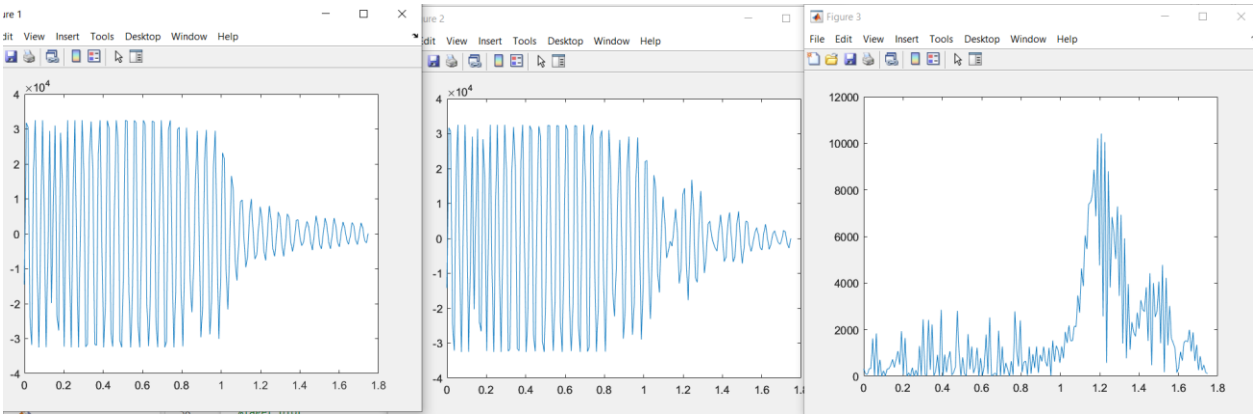
- Tau: 811.333



- Try 2
  - Start Time: 9189
  - Stop Time: 20907 (program rounded it to 08)
  - Measured distance = 1.4
  - Tau: 1333



- Try 3
  - Start Time: 10522
  - Stop Time: 22241
  - Measured Distance = 1.2
  - Tau: 667 (rounded)



- Try 4 (Final- figures published by matlab code)
    - Start Time: 11189 (program rounded it to 88)
    - Stop Time: 22908 (program rounded it to 07)
    - Measured Distance: 1.0613