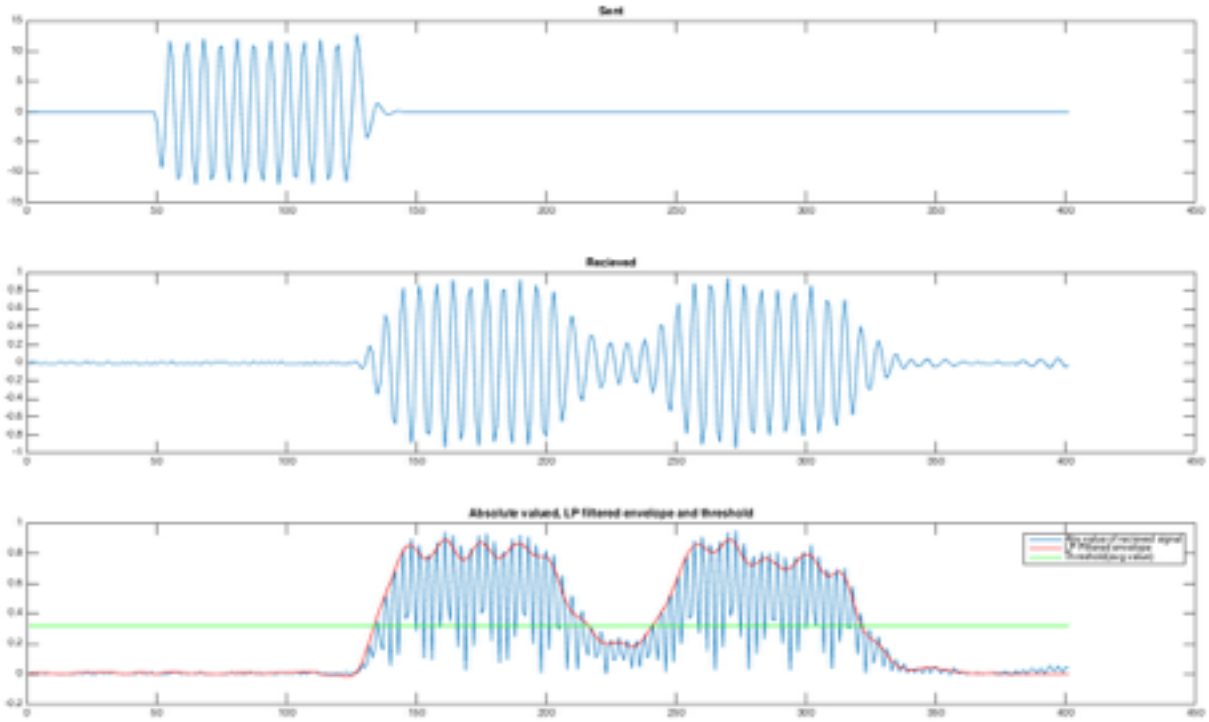
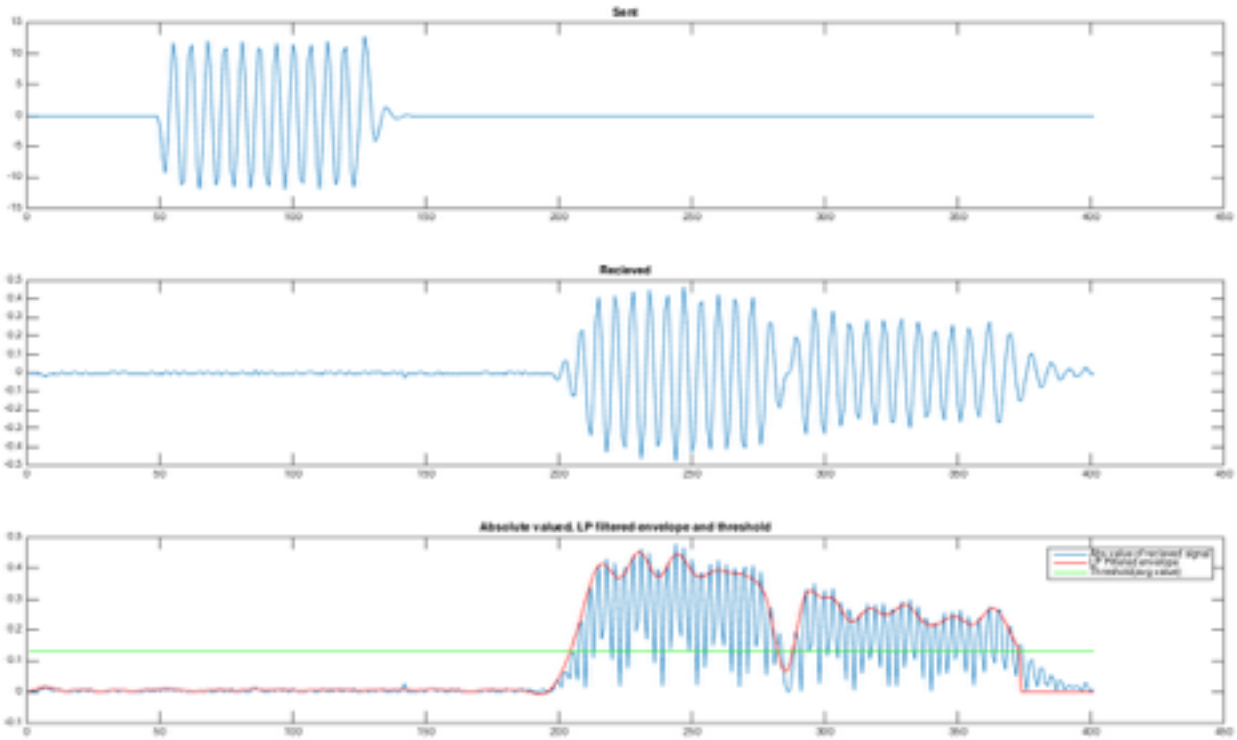
First Test of sonar detection algorithm

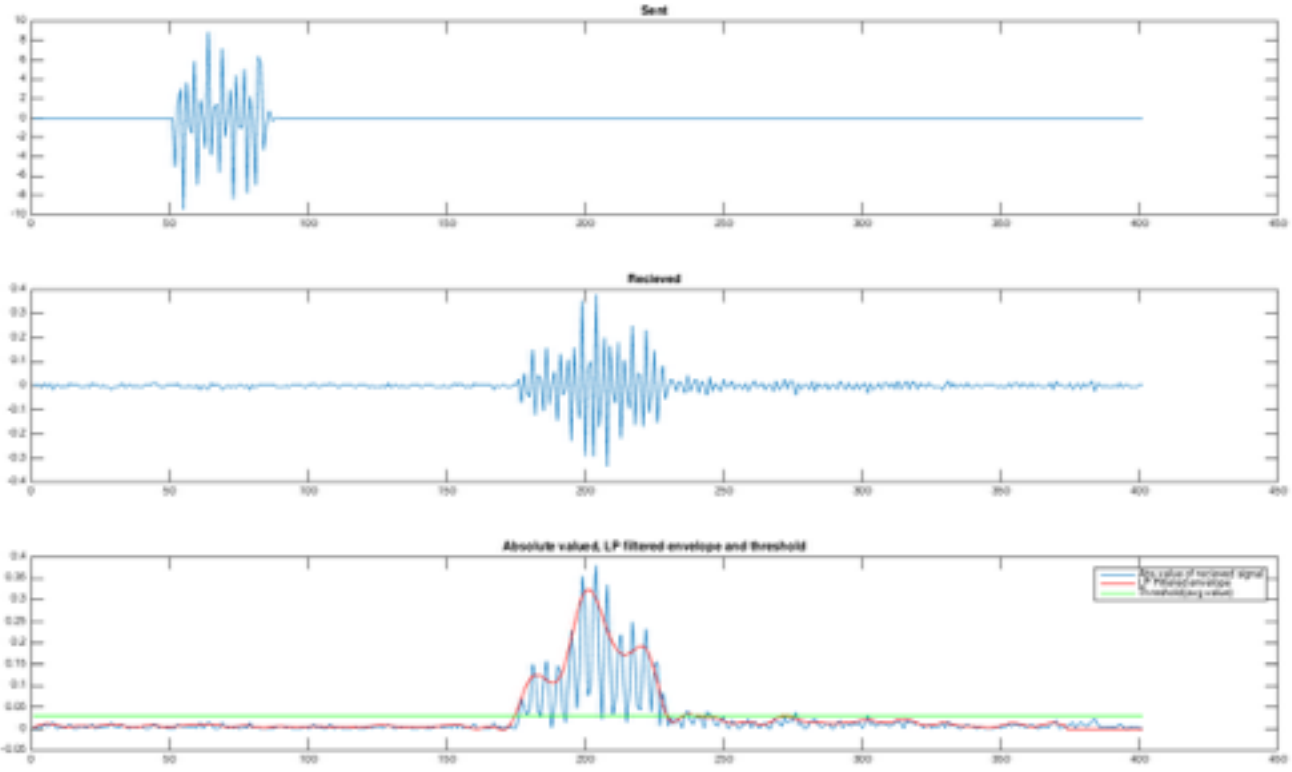
Here are the first results from the algorithm I have tested. It is quite simple and uses a couple of steps on the received signal

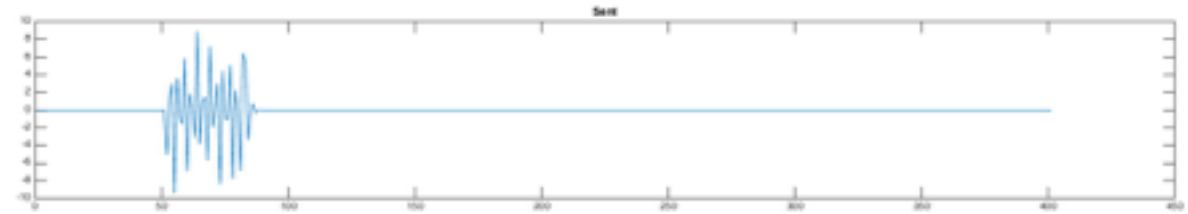
1. Absolute value of received signal
2. Low pass filter it to create an envelope with cutoff frequency at 20kHz
3. Create threshold by finding the average of the signal
4. Find first point where the signal value is larger than the threshold

The filtering procedure works well, but the threshold is not good enough yet. Just averaging is obviously not good enough. I will try to look into some other thresholding methods soon and see what I can do. Underneath are the plots for 0.5m, 1m, 2m, 3m and 4m depth respectively. If it is hard to see, on each figure, the first plot is the sent signal and the second is the received(Or that is what I assume). The third on has the absolute valued version of the received signal in blue, in red is the envelope and the threshold is in green.




Sent
Recieved
Absolute valued, LP filtered envelope and threshold
Abs value of recieved signal
LP filtered envelope
Threshold(avg value)


Sent
Recieved
Absolute valued, LP filtered envelope and threshold
Abs value of recieved signal
LP filtered envelope
Threshold(avg value)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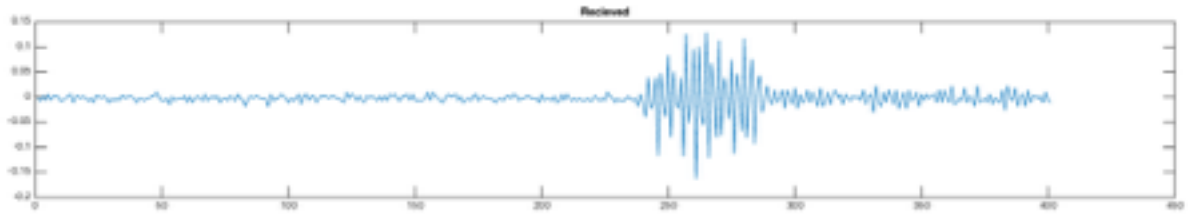
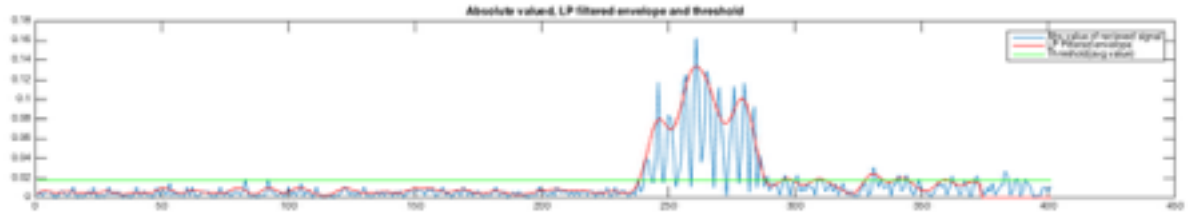
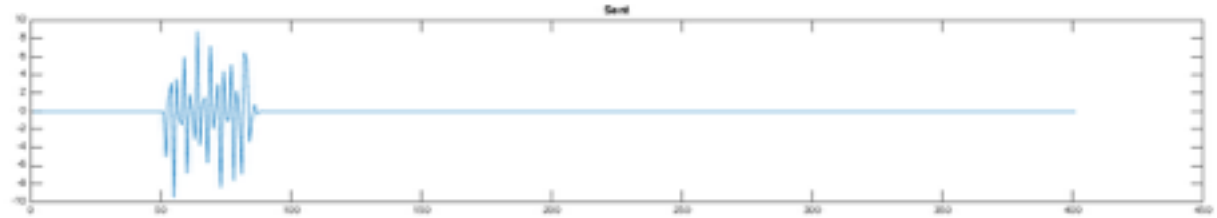

Recieved


Absolute valued, LP filtered envelope and threshold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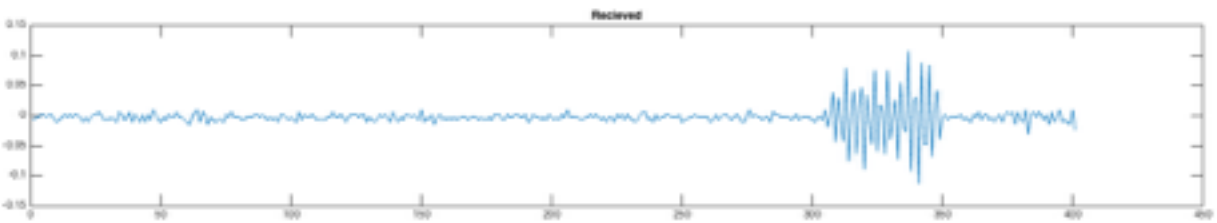
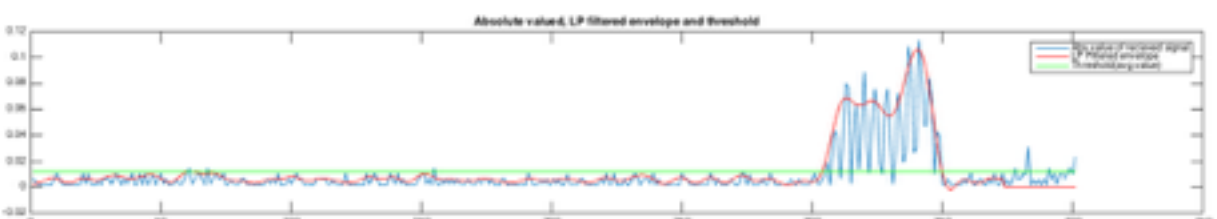

Recieved


Absolute valued, LP filtered envelope and threshold