

醫用超音波專題

Computer Homework #3: Nonlinear Imaging

Due 12:00am 5/29/2002 by emailing to

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Load hw3data.mat. The variables are:

fs: sampling frequency.

f0: center frequency of the ultrasonic signal.

soundv: sound velocity.

pri: pulse repetition interval.

y0INV: data with pulse inversion.

y0NONINV: data without pulse inversion.

All data are in the units of *mm* and/or μsec . Note that both y0INV and y0NONINV are 128X101, representing received RF echoes from a moving target at a certain depth with 128 firings.

1. Based on y0NONINV, plot the RF spectrum to show the nonlinearity of the target. Use the fundamental signal to find the velocity of the target. Compare the velocity to the results using the second harmonic signal, and the signal covering the entire spectrum. (50%)
2. Based on y0INV, implement the pulse inversion technique. Compare the Doppler spectrum to the one obtained in 1. Find the velocity of the target. (50%)
3. Explore any related issues based on the same data file. (bonus)