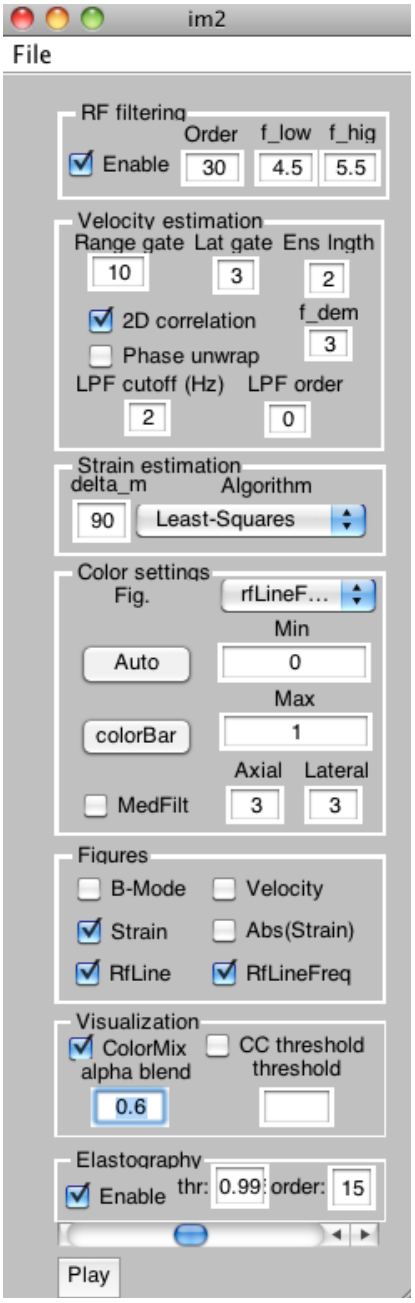
DSPview

Demonstration video

3.1 The graphical user interface

A screenshot of the MATLAB GUI is shown to the right. While it may not be a feast for the eyes, the GUI is an invaluable tool in parameter optimization once it is known what the different switches and inputs control:



RF filtering
These settings control the bandpass filter that filters each RF scan line in the axial direction. "f_low" and "f_high", given in MHz, are the lower and upper cut-off frequencies for the bandpass filter, while "order" is the filter order. The filter is generated by the *fir1(..)* function.

Velocity estimation
The "Range", "Lat." and "Ens." gate settings control the autocorrelation parameters explained earlier in section 2.1. "2D correlation" enables the 2D-AC estimator, if disabled the 1D-AC estimator is used instead. The "f_dem" parameter is only used for 1D-AC estimation, and controls the demodulation frequency f_0 in Eq. (2.7). The "Phase unwrap" option enables axial phase unwrapping along the scan lines (using the *unwrap(..)* function), which can undo the effect of aliasing in certain cases. The cut-off and order inputs control the optional slow-time filtering of the velocity estimates.

Strain estimation
Controls the length of the axial strain segments by setting the parameter Δm used by the strain estimators. The drop-down menu allows the user choose between least-squares and the central-difference estimation.

Color settings
This panel controls how the images are presented. The range of the colormap can be inputted manually, using the "Min" and "Max" boxes, or the user can let the program automatically pick the range by pressing the "Auto" button. The "colorBar" button produces a color bar which visually shows the mapping between colors and values. The user can also enable median filtering, and change the median filter parameters in the "Axial" and "Lateral" input boxes.

Figures
These checkboxes decide which images are displayed at any given time. In addition to the output from the algorithmic steps, the raw RF signal from a single scan line can be viewed ("RfLine"), or the PSD of the same line ("RfLineFreq"). The PSD figure can be useful to have enabled when tuning the RF filter.

Visualization
Allows the user to alpha blend the output image with the B-mode image in the background, with a user supplied alpha value. The CC threshold option enables correlation coefficient thresholding, with the given threshold.

Elastography
Enables/disables the elastographic processing. The "order" parameter sets the order of the LPF used on the strain magnitude frames. The "thr" parameter is the correlation threshold used in the adaptive scaling in Eq. (2.23).

Slider and playback
By moving the slider at the bottom of the GUI with the mouse, the user can navigate back and forth through the data set. Dragging the slider to the right will advance to the next frame, and to the left to the previous frame. All open figures are updated as soon as calculations have finished. The PLAY button plays through the entire data set.