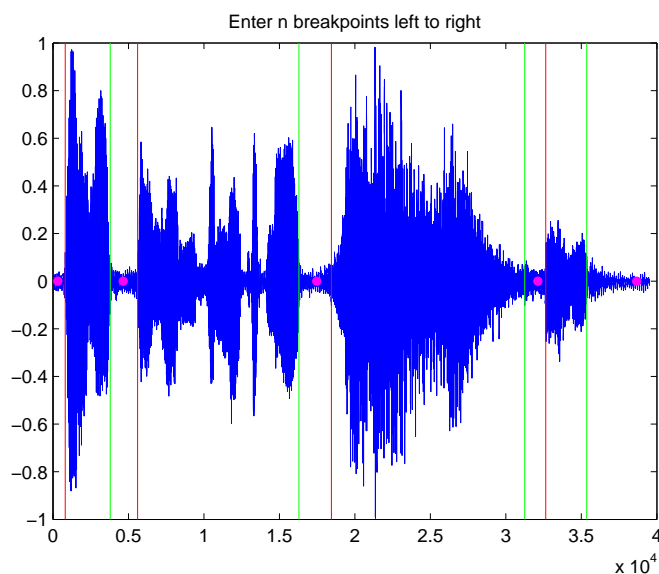


## Segmenting a sound file

If you have headphones, you can listen to the sound files in the lab. However, you can just write the code now and listen to the results later.

Download the file `segmentByClicks.m` from the Exercises page. Several sound files are available from the Lecture 22 (4/10) posting. Read and run the function to make sure that you understand it. The function segments the sound file into  $n - 1$  parts (stored in a cell array) based on  $n$  user-selected “breakpoints.” Notice that when you use function `ginput` without an argument, during execution the program accepts user mouse clicks until the *Enter* key is pressed.

You will modify function `segmentByClicks` to remove the noise during the hulls from the sound data (or store only sound data above a certain threshold) in the cell array. Also indicate on the plot the user-selected breakpoints and the beginning and end of each sound segment with a red line and a green line, respectively. (See the plot in color on-line.)



To do this, first reduce the “spikiness” of the data by writing and using the following function:

```
function d = reduceSpikes(data)
% Replace each value in data (a vector of length n) with the average of
% the values in the 5-point neighborhood and store the result in d.
```

Choose an appropriate way to deal with the data points at the beginning and end of the array.

In function `segmentByClicks.m`, call function `reduceSpikes` to reduce the “spikiness” of the data. Modify the code so that given a breakpoint  $b$ , the function sets the end of the sound segment to the left of  $b$  and the beginning of the segment to the right of  $b$  to be the nearest values that are greater than some pre-determined threshold. A reasonable sound threshold is 0.1 and you can experiment with different values. We will assume that a user will select the breakpoints in a reasonable way. Add markers to the plot to indicate the user-selected breakpoints. Add lines to the plot to mark the beginning of a sound segment with a red line and the end of a sound segment with a green line.

Several sound files are available from the Lecture 22 (4/10) posting. The above plot is based on `austin.wav` (with the spikes reduced).

**Please delete your files from the computer before you leave the lab.**