MATLAB OR MATHSCRIPT PROGRAMS FOR TEXTBOOK EXAMPLES

These are the programs used to compute the output for each example in the text requiring use of a computer. Except for Example 4-6, either MATLAB or the version of Mathscript included on this DVD may be used to run these programs. Programs are listed by example number.

Each program includes: (1) Example number, (2) Purpose, which matches the text wording, (3) Inputs, which includes parameters and .mat files of trumpet signals, when those are used, (4) Outputs, which are plots and, sometimes, audio produced using `soundsc`, (5) Comments and details on the procedure used to solve the problem, and (6) a complete program listing.

The purpose of including these programs is to allow you to vary the input parameters and generate the resulting outputs. You can "play around" with the examples and learn how each system behaves using different numbers. You can also listen to noisy and filtered trumpet signals. For example, the noisy trumpet signal filtered using a resonator filter does not *appear* to resemble the noiseless trumpet signal any more than the noisy trumpet signal filtered using a Butterworth filter, but the resonator-filtered noisy trumpet signal *sounds* much less noisy than the Butterworth-filtered noisy trumpet signal.

The figures used in the text were redrawn from the plots generated by these programs.

For Examples in which noise is added to a signal, the noisy signal computed using these programs will differ slightly from that shown in the text, since the (random) noise is different.

Although note A has a fundamental frequency of 440 Hz, the actual trumpet signal used in these Examples has a fundamental frequency closer to 436 Hz. The trumpet is slightly out of tune.

Although note B has a fundamental frequency of 494 Hz, the actual trumpet signal used in these Examples has a fundamental frequency closer to 491 Hz. The trumpet is slightly out of tune.

Axis labels and commands like `subplot` and `axis tight` have been omitted on occasion.

RUNNING MATHSCRIPT SCRIPTS

After installing the student version of National Instruments LabVIEW from the CD, the programs (called scripts or .m files) can be run using Mathscript using the following procedure:

- LabVIEW is in C:\Program Files\National Instruments\LabVIEW 2010.
- All .m files and .mat files on the CD should be in C:\Documents and Settings\User\My Documents\LabVIEW Data.

1. Select **Tools**, and click on **Mathscript**.
2. Select **File→Open Script** and left-click on the desired .m file. The desired program will appear in a window, with line numbers.
3. To run the displayed program, left-click on the right-pointing green arrow.

All of the .m files on the CD will run on the student version of Mathscript included on the CD. However, if you write your own .m files, the following differences between MATLAB and Mathscript should be noted:

- There is no >> prompt in Mathscript.
- When `subplot(211)` is used in Mathscript, a second, blank "Graph #2" will appear below the desired plot.
- Plot axes are sometimes labelled with `2E+3` in Mathscript, instead of `2000`.
- `load trumpet.mat` does not work in Mathscript; use `load 'trumpet.mat'`. This will work in both MATLAB and Mathscript.
- `axis tight` does not work in Mathscript.
- Run times may be longer in Mathscript.