%%%%% ASSIGNMENT03 (2023)
%%%%% INTRODUCTION TO LINEAR OPERATORS

% Students may use any software, but instructions are provided for implementation in MATLAB (easiest). Where appropriate recommended MATLAB functions are indicated in **bold** text. Turn in hard copy of requested exercises including plots, answers, and associated code (but only those sections specifically requested). Assignment is due in one week's time at the start of the next practicum meeting. Instructor's MATLAB answer key will be provided after all students have turned in homework.

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%%%%% Goals: read in an earthquake seismogram and manipulate it to plot its velocity, acceleration, and displacement traces with proper scaling and correctly annotated physical units.

%% 1: Read in **Erebus_seismogram.mat**. This is a 'velocity seismogram' (i.e., vertical ground motion) signal. Information about the signal (called **data**) is found in the variable **hdr**. **hdr.sps** gives the sample rate in Hz and **hdr.atod** gives the conversion used by the digitizer in units of volts/count. Note that the seismometer sensitivity is 3200 V/m/s. Plot the seismogram with proper time and amplitude scaling. For amplitude of your graph use units of mm/s. Note: for seismograms you will want to remove the DC offset, which can be done by subtracting the mean or using the MATLAB function **detrend**.

%% 2: Plot a properly scaled acceleration seismogram (units of $mm/s^2$). Be careful to use the proper time differentiation constant. Hint: you can use **diff** to differentiate.

%% 3: Plot a properly scaled displacement seismogram (units of mm). Hint: you can use **cumsum** to differentiate.