1. (COMPUTER) Recall equation (7.17) for the vibroseis sweep function:

\[ v(t) = A(t) \sin[2\pi(f_0 + bt)t]. \]

(a) Solve for \(f_0\) and \(b\) in the case of a 20-s long sweep between 1 and 4 Hz. Hint: \(b = 3/20\) is incorrect! Think about how rapidly the phase changes with time.

(b) Compute and plot \(v(t)\) for this sweep function. Assume that \(A(t) = \sin^2(\pi t/20)\) (this is termed a Hanning taper; note that it goes smoothly to zero at \(t = 0\) and \(t = 20\) s). Check your results and make sure that you have the right period at each end of the sweep.

(c) Compute and plot the autocorrelation of \(v(t)\) between \(-2\) and \(2\) s.