Set #7

Due Thursday March 15, 2018

Problems:
1. Z&T text 2.69.
2. Z&T text 2.70. Best worked using the bandpass sampling tools found near the end of the Chapter 3 Jupyter notebook.
4. To be turned in. Z&T text drill problem 3.12. Show/justify all of your work, not just the answer.
5. Z&T text 3.29.
6. To be turned in. In modern software defined radio (SDR) receivers undersampling is often used to frequency translate an IF or RF signal close to DC, while at the same time digitizing the signal. The close to DC center frequency translated to is typically $f_s/4$, so that complex frequency translation in DSP is easy (no real multiplies required). Assuming the signal of interest is centered at $f_{IF}$ and has bandwidth $B$ Hz. The guiding design formulas are find some positive integer $M$ such that

$$|f_{IF} - Mf_s| = f_s/4$$
$$B \leq f_s/2$$

For this problem assume that $f_{IF}$ is near 10.7 MHz and $B = 200$ kHz. Find two values of $M$ that work and corresponding values of $f_s$. Verify your answers using hand sketched spectra or a plot created with the function `$BP_spec()` as found near the end of the Chapter 3 Jupyter notebook.