Assignment 4 (Due Feb 26). Covers: pages 101-105, 129-140 of text.

The questions marked "Optional" are more challenging, and will not count toward your final grade. They will however strengthen both your technical skills and your conceptual understanding of the material.

- Q1. Do Exercise 3 of Chapter 4 in the textbook.
- Q2 (Optional). Do Exercise 1 of Chapter 5 in the textbook.
- Q3. Do Exercise 2 of Chapter 5 in the textbook.
- Q4. Do Exercise 3(a) of Chapter 5 in the textbook.
- Q5. Do Exercise 4 of Chapter 5 in the textbook.
- Q6 (Optional). Do Exercise 5 of Chapter 5 in the textbook.
- Q7. Do Exercise 6 of Chapter 5 in the textbook.
- Q8. Do Exercise 9 of Chapter 5 in the textbook.
- Q9 (a). Let $a > 0$, and let b, c be real numbers. Let $f : \mathbf{R} \to \mathbf{C}$ be the function $f(x) = e^{-\pi(ax^2+bx+c)}$. Explain briefly why f is a Schwartz function, and compute the Fourier transform $\hat{f}$ of f. (Hint: use a linear change of variables to transform this problem to a computation which is already done in the textbook.)
- Q9 (b) (Optional - only attempt if you have taken Math 132 or equivalent). Repeat the above exercise, but now assume that b, c are complex numbers, and that a is a complex number such that $\text{Re}(a) > 0$. (The formula should look almost the same, but the proof will require some contour integration).