

## Homework 1

Due: Tuesday, February 10

**Section 2.5:** 2.1, 2.4, G2.5, G2.6

**Section 3.5:** 3.1 (Note that I removed G3.17)

**E2.2:** Verify the identity

$$(D_2^j f)^\wedge(\omega) = 2^{\frac{j}{2}} \hat{f}(2^j \omega)$$

where  $D_2^j$  is the dilation operator defined by

$$D_2^j f(x) = 2^{-\frac{j}{2}} f(2^{-j} x).$$

**E2.3:** Prove the following:

If there exist constants  $K, \epsilon > 0$  such that

$$|\hat{f}(\omega)| \leq \frac{K}{1 + |\omega|^{p+1+\epsilon}}$$

then  $f \in C^p$ .