

**Homework set 6 — APPM5440**

**From the textbook:** 2.10, 2.11, 2.12. If you have time, do 2.14.

**Problem 1:** Let  $X$  be a compact metric space. Let  $(f_n)_{n=1}^{\infty}$  be a sequence of real-valued functions on  $X$  that converges pointwise to a real-valued function  $f$ . Suppose that there exists a finite  $C$  such that  $\text{Lip}(f_n) \leq C$  for all  $n$ . Prove that  $(f_n)_{n=1}^{\infty}$  converges uniformly to  $f$ .