MATH 322/422 Spring 2022

Assignment #11, notes and hints

Problem 11.5.3 This was discussed in class, you are supposed to supply the details. Also note the "if and only if" and "unique" aspects, which were not emphasized in class.

Problem 11.6.3 You can use either Definition11.29 from the text or the equivalent characterization given by Lemma 11.30, your choice.

Problem 11.7.5 This should parallel the discussion from Chapter 5, but note that now we are considering functions defined on a subset E of some Euclidean space with values in (a possibly different) Euclidean space.

Problem 11.9.1 This is a little tricky since we do not know that E is compact (it may fail to be closed) and if E is not compact and f is just continuous (as opposed to uniformly continuous), then f does not need to be bounded.

There are several possible lines of argument, here are two of them:

1. Find a similar statement in Chapter 5 and try to mimic the proof. An important point is that, for any given $\delta > 0$, the bounded set E can be covered by a finite number of balls of radius δ. (Explain why, one possible hint is that it is very easy to find a compact set F such that $F \supset E$.)
2. Use a generalization of (the first statement of) Exercise 5.6.8 to the setting of $\mathbb{R}^n$. You do not need to prove the generalization, just properly state it.

Additional Problem Don't forget the Additional Problem; it is not meant to be for extra credit.