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Functional Analysis — Problem Set 1

Issued: 3.2.10 Due: 8.2.10, in class

1.1. Conway, page 6, Exercise 3.

Let $\mathcal{H}$ be the collection of all absolutely continuous functions $f : [0,1] \longrightarrow \mathbb{F}$ such that $f(0) = 0$ and $f' \in L^2[0,1]$. Show that with $\langle f, g\rangle = \int f'(t)\overline{g}'(t)\,dt$, $\mathcal{H}$ is a Hilbert space.

1.2. Conway, page 7, Exercise 6.

1.3. Conway, page 7, Exercise 9.

1.4. Conway, page 11, Exercise 3.

1.5. Conway, page 11, Exercise 6.

1.6. Conway, page 13, Exercise 3.

1.7. Conway, page 13, Exercise 5. (Due only on the 10th)

1.8. Conway, page 13, Exercise 6. (Due only on the 10th)

Note that all problems can be solved using the material covered on 1.2 and 3.2. I did not copy the problems as you can find them by looking up conway's book, 2nd edition, at google books.