Assignment #2

Due Friday, 31 January 2020, at the start of class

Please read Chapters 1 and 7 of the textbook. Also review the slides *Finite-dimensional spectral theory I* at

bueler.github.io/M617S20/slides1.pdf

This Assignment is shorter than the first, and probably easier.

One exercise below is identified with your initials. Please LaTeX this problem and send both the `.tex` and `.pdf` to me at `elbueler@alaska.edu` by the same due date as above. See the course website for a LaTeX template.

DO THE FOLLOWING EXERCISES from the textbook:[1]

- #3 in Exercises 7.7, page 100. *Easy. Just compute two norms and leave it at that.*
- #6 in Exercises 7.7, page 101. $\longleftarrow$ **OS**
- #7 in Exercises 7.7, page 101. *Prove the first sentence. Find examples for the second sentence. For the third sentence, state and prove a lemma, or provide a counterexample.*
- #1 in Exercises 7.14, page 105. $\longleftarrow$ **WV**
- #2 in Exercises 7.14, page 105.
- #3 in Exercises 7.14, page 105. $\longleftarrow$ **DD** *"Convex" and "convex hull" are defined on pages 91–92. I am confused on what set the author gives as a counterexample, but there exist closed sets $\mathbb{R}^2$ for which the convex hull is not closed. You should produce such an example for the first sentence and then prove the second sentence.*
- Prove that if $A \in \mathbb{C}^{n\times n}$ is hermitian and if $\lambda \in \mathbb{C}$ is an eigenvalue of A then $\lambda \in \mathbb{R}$.

[1] J. Muscat, *Functional Analysis An Introduction to Metric Spaces, Hilbert Spaces, and Banach Algebras*, Springer 2014