

TMA4230 FUNCTIONAL ANALYSIS, WEEK 10

LAST WEEK: Last week we defined the spectrum of an element of a complex algebra with identity and we shown among other things that the spectrum is compact.

- Section 7.3–7.7 of the book.
- Page 61–65 of the notes.

THIS WEEK: This week will finish Chapter 7 by showing that the spectrum of an element x of a complex algebra with identity is always non-empty and that the spectral radius of x is equal to $\lim_{n \rightarrow \infty} \|x^n\|^{1/n}$. We will then begin on Chapter 9 which deals with spectral theory for bounded self-adjoint linear operators on Hilbert spaces. I expect to cover Section 9.1 and maybe parts of Section 9.2.

- Section 7.3–7.7 of the book.
- Page 61–65 of the notes.
- Spectral properties of bounded self-adjoint linear operators (Section 9.1–9.2).

NEXT WEEK: Next week we shall continue with spectral theory for bounded self-adjoint linear operators on Hilbert spaces. I expect to cover Section 9.2–9.5 and maybe also parts of Section 9.6.

- Spectral properties of bounded self-adjoint linear operators (Section 9.2).
- Positive operators (Section 9.3).
- Square roots of positive operators (Section 9.4).
- Projection operators (Section 9.5–9.6).

EXERCISES FOR NEXT WEEK: 7.3.9, 7.4.8, 7.4.9, 7.5.5, 7.5.9, 7.6.3 and 7.7.7.