C4.1 Further Functional Analysis — Some Pre-recorded Videos

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I'm releasing some of the 2020 pre-recorded videos for the course. This document provides a guide to these videos, what they cover, and why they are included. Each video has as a small table of contents, and you can also click through the captions to the video to navigate the videos.

My thanks to Sergio Giron Pacheo for help with video post production, captions and proof watching. Remaining errors remain my responsibility!

- 1.1 Discussion of what is functional analysis, and what's in the course. Brief discussion of books.
- 1.2 Discussion of background and prerequistes needed for the course.
- 1.4 Background on normed spaces, setting out notation, as in Section 1 of the notes.
- 5.2. This video covers 5.6, 5.7 and 5.8. In particular I give a proof of the one-step extension lemma 5.8 which I will omit from lectures as it appears in B4.1.
- 7.2 Discussion of reflexivity of ℓ^p for $1 < p < \infty$. This is covered in B4.1 and I'm including it here for either revision, or students who've not seen this in previous courses.
- 9.1 This is a background video which motivates need for weaker topologies, and then gives some background from the topology course on bases. We then talk about weakest topologies making functionals continuous and cover Def 9.1 and Prop 9.7. My experience is students find this section of the course on weak topologies difficult - we won't have time to do this background from part A topology in lectures, but I hope the pre-recorded video will help.
- 11.2 Covers the material in 10.7-10.10, which has also appeared in the metric spaces part A course. I will lecture this (but only very quickly) so this video will support the proof.
- 15.1. Examples of Schaduer bases. Gives some details on the examples given in the notes, but omited from lectures.

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- 15.2. Covers 15.1 and 15.2. This will also expand on the material in lectures.
- A. Baire's theorem and its applicaitons. This video covers appendix A and may be useful for revision, or for OMMS students who've not seen this in previous courses.