PM 950 : Possible Talks

The project is to read some sections from a book or a short paper on a topic related to the course. It should not be something that you learned in another course. I want a short write-up that puts things in your own words, say 4 to 10 pages including references to all sources used. You will also give a 40 minute presentation.

Here are some possible topics. They are not in any particular order. If you have other ideas for a project, you just have to clear the idea with me. Let me know your choice, because these topics are first come, first served.

The reference Douglas refers to *Banach algebra techniques in operator theory*, 2nd. ed.

1. Extreme points of the balls of H^1 and H^∞. Hoffman p.136–142 or Duren p.123–126.
2. Isometries of H^∞ and H^1. Hoffman p.142–149.
3. Analytic discs in the maximal ideal space of H^∞. Hoffman p.166–169, 187–189 or Garnett p.400–410.
4. Conformal maps and H^1. Koosis p.52–56 or Duren p.42–45.
5. Unique predual of H^∞. Garnett p.205–212.
6. H^p of a half space. Hoffman p.121–133 or Duren p.187–197.
7. Linear functionals of H^p for $0 < p < 1$ and failure of the Hahn-Banach Theorem. Duren p.115–123.
8. Beurling–Lax–Halmos Theorem: invariant subspaces for shifts of higher multiplicity. P.R. Halmos, *Shifts on Hilbert space*, J. reine angew. Math. **208** (1961), 102–112.
9. Maximal ideal space and invertibility in $H^\infty + C$. Douglas p.148–153.
10. Toeplitz operators with continuous symbol. Douglas (p.158–163)+ p.164–166.
11. Taylor coefficients of H^p functions. Duren p.93–99.
12. Smoothness of boundary values. Duren p.71–79.
13. Privalov's Theorem: if an analytic function on $\mathbb{D}$ has 0 as a radial limit on a set of positive measure in $\mathbb{T}$, then $f = 0$. Koosis p.58–63.
14. Carleson–Jacobs Theorem: when is the closest function in H^∞ to $f \in \mathrm{C}(\mathbb{T})$ in the disk algebra? Garnett p.139–144.
15. Zygmund's $L \log L$ Theorem: $\|\tilde{u}\|_1 \leq c\big\||u| \log |u|\big\|_1 + 2\pi$ and conversely if $u \geq 0$ and $u + i\tilde{u} \in H^1$, then $|u| \log |u| \in L^1$. Koosis p.96–98 or Duren p.58–61.