PROJECT FOR HONORS ANALYSIS

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INSTRUCTIONS

(1) Write your report in print form in a very readable way or use a software (Latex etc.)

(2) You can submit your homework in groups (not more than 3 people)

(3) You need to make an appointment with me and talk about your progress at least once. The appointment should be earlier than 20 November. (All group members should be present)

PART I

(0) What do you think about this course and classes and my teaching? How can this course be improved?

(1) Read the paper (not necessarily understanding the details) and summarize it. Include main results. What do you think about the paper.

(2) Obtain the 3rd reference using library and databases from library. Write the process of obtaining this paper. Note that use of Google (including Google Scholar) or other search engines are not allowed. Do not pay anything. Write the whole process. (If you talked to anybody, write it.) Note that whole process is part of the project.

(3) What do you think about this project.

This part of the project is due ________________
PART II
Due Wednesday, 2 December 2009 in class.

(1) **(Example numbered 1 and 1′)** Prove the all statements in the example numbered by 1 and 1′.

(2) **(Example numbered 2)** Prove this.

(3) **(Example numbered 1)** Prove the all statements in the example numbered by 3. Give the details.

(4) **(Definition numbered by 5)** Make sure you understand the definition and notation. Take an example sequence for this sequence show all the relevant things from the definition.

(5) **(Paragraph numbered by 4)** Make sure you understand this paragraph.

(6) **(Paragraph 20)** Understand the underlined theorems and vocabulary. State the theorems and give a proof of these theorems if it is not covered already in class.

(7) **(Theorem numbered by 6)** Make sure you understand the theorem. Give an example illustrating the theorem.

(8) **(Paragraph numbered by 7)** Make sure you understand this paragraph. State Axiom of Choice. Give an example where you use Axiom of Choice.

(9) **(Proof numbered by 8)** Make sure you understand the proof. Give the details (if there is something missing). Summarize the proof and tell the main idea. **What does uniform convergence mean in this setting.**
(10) **Theorem numbered by 9** Make sure you understand the theorem. Give an example illustrating the theorem.

(11) **Proof numbered by 10** Make sure you understand the proof. Give the details (if there is something missing). Summarize the proof and tell the main idea. What does lexicographic order mean. What is the lexicographic order in this proof.

(12) **Figures numbered by 11-12** What does this figures represent.

(13) **Paragraph numbered by 13** Make sure you understand the statements. State the generalizations of Theorem 1 in metric space setting and Theorem 2 in $\mathbb{R}^n$. Give the proofs.

(14) **Example numbered by 14** Prove the all statements in the example numbered by 3. Give the details. Give another example showing that Theorem 2 cannot be generalized to metric spaces. You can use the Statement 15 as hint.

(15) **Statements numbered by 15-16** Make sure you understand the statements.

(16) **Statements numbered by 17** Understand the proof of this statement from Kuratowski.

(17) **Theorem numbered by 19** Make sure you understand the theorem. Give an example illustrating the theorem.

(18) Prove Theorem 3.

(19) **Statements numbered by 18** Why does the author require that $F \neq \phi$?
(20) What is our conclusion about the paper?

(21) What are the questions arising from the paper?