Review for Final exam

Final Exam: December 12, 8:00am-10:00am. Open book exam
Extra office hour: December 10, 11, 12:30-2:30pm

Chapter 1 and 2, see "Review for Midterm".

On Sobolev space (Chapter 5).

Basic concepts: Weak solutions (how weak it could be?), Holder space, Sobolev space. Density, extension are not discussed in class.

Exercise 1: a). Find a continuous function $f(x)$ in $(0,1)$ which is not in Holder space $C^{0,1/2}(0,1)$.

b)*. Prove that if $u \in H^1(\Omega)$, then $u_+(x) := \max\{u(x),\ 0\} \in H^1(\Omega)$. (**hint: one may need to use the approximation**)

Embedding inequality and compact embedding: I hope at least you write down the proof of G-N-S inequality once, Poincáre inequality, compact embedding.

Exercise 2: Let Ω be a bounded domain in R^n. Prove for any $p > 1$, there is a constant C such that, for all $f \in C_0^\infty(\Omega)$,

$$||f - f_A||_{L^p(\Omega)} \leq C||\nabla f||_{L^p(\Omega)}$$

where $f_A = \frac{1}{\Omega}\int_\Omega f dx$.

On the existences of weak solutions

Three types of elliptic equations: Riesz, Lax-Milgram, existence of minimizer, etc. All were discussed in the past two weeks.

WARNING: YOU ARE RESPONSIBLE FOR CHECKING OUT MY TYPOS!

Comments and question to: mzhu@math.ou.edu