MATH 515 summary

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1 Initial meeting

We gave an introduction to the course. We discussed the topics. It seems a good idea to include boundary layer. I sent a request for a classroom for Mon Wed 10am-11:15am.

2 Lebesgue integral

1. Motivation: weak solutions are limits of $L^2$ functions, and we need limit properties in $L^2$. Lebesgue integral sets the framework for $L^p$.

2. review Riemann integral.

3. rough definition for Lebesgue integral.

4. Lebesgue measure, measurable sets and measurable functions.

5. basic properties of Lebesgue integral.

References: This is usually taught in MATH 507. See Wikipedia for a good summary.
A few references:

1. Ladyzhenskaya [3]: classical book for PDE theory of NS
2. Temam [5]: good for both theoretical and numerical analysis (finite element)
4. Chorin and Marsden [1]: We will follow it for the derivation of Euler and NS.
5. Galdi [2]: comprehensive treatise on stationary Navier-Stokes equations
6. Tsai [6]

References


