

Reading instructions for part 3 of Partial Differential Equations.

John Andersson johnan@kth.se

Reading material: Course notes “*The Obstacle Problem.*” at the course web-page.

Reading:

1. **Lecture 1 December 3rd.** Read the introduction and chapter 2. The chapter has a long appendix on Sobolev spaces. That appendix more of an overview with some background analysis needed in order to understand the main part of the chapter. You are not expected to prove the results in the appendix.¹ You must however have a basic understanding of the definitions and concepts in the appendix. Make sure that you learn the following

- The concept of weak convergence and weak compactness of the spaces L^2 and $W^{1,2}$
- The concept of a weak derivative.
- Knowing about the problem of defining boundary values for functions in $W^{1,2}$ as well as the concept of Traces.

You don't have to know how to prove any of these results but you should have an idea of how the proofs are done (How else can we know that we have understood a concept?)

2. **Lecture 2 December 10th.** Chapter 3 and Chapter 4.
3. **lecture 3 December 17th.** Chapter 5.

Exercises: Each chapter in the notes have some exercises. Try to look at as many as you can. Some more might get added as we go along. The homework assignment for the final part of the course will be taken from these exercises - at least in part.

¹And very few proofs are included. Most results have some motivation though. At times it is a proof sketch and at times it is an argument in \mathbb{R} where we can use Fourier series to show the ideas.