

## MATH 231A: 10 LECTURE REFERENCES

### 1. MAXIMUM PRINCIPLE

- The maximum principle is one of the central themes in elliptic PDE, and some version of it is presented in almost every text. For a detailed discussion of such estimates read Chapter 2 of [3], Chapter 3 of [2] and Chapter 2 of Jost's book (on reserve in the library).
- One of the most important things about the maximum principle is that it adapts itself well to *scalar* non-linear problems, as well as to some classes of non-linear *systems*. It is often the first key step in showing existence for non-linear equations. See Chapter 11, and in particular Section 11.3 of [2] for more.

### 2. CONTINUITY LEMMA AND GENERAL EXISTENCE THEORY

- The most basic and classical application of Schauder estimates is the one given in class and in the notes on the existence of  $C^{2,\alpha}$  solutions of general elliptic equations with non-positive  $c(x)$  coefficient. This material is explained in Section 6.3 of [2], Chapter 6 of [4], and Chapter 11 of Jost's book (on reserve in the library).

### REFERENCES

- [1] Giaquinta, Mariano **Introduction to regularity theory for nonlinear elliptic systems**. Lectures in Mathematics ETH Zürich. Birkhäuser Verlag, Basel, 1993. viii+131 pp.
- [2] Gilbarg, David; Trudinger, Neil S. **Elliptic partial differential equations of second order**. Reprint of the 1998 edition. Classics in Mathematics. Springer-Verlag, Berlin, 2001. xiv+517 pp.
- [3] Han, Qing; Lin, Fanghua **Elliptic partial differential equations**. Courant Lecture Notes in Mathematics, 1. New York University, Courant Institute of Mathematical Sciences, New York; American Mathematical Society, Providence, RI, 1997. x+144 pp.
- [4] Wu, Zhuoqun; Yin, Jingxue; Wang, Chunpeng **Elliptic & parabolic equations**. World Scientific Publishing Co. Pte. Ltd., Hackensack, NJ, 2006. xvi+408 pp.