

## Some Literature for the course

# Pseudodifferential Operators and Microlocal Analysis

*Disclaimer:* This list is far from being complete and matter to my personal taste.

1. X. Saint Raymond, *Elementary Introduction to the Theory of Pseudodifferential Operators* (Studies in Advanced Mathematics, CRC Press, Boca Raton, 1991.)  
The book of our choice for this course. Gentle and thorough introduction into the topic—maybe a little limited in the range of applications covered.
2. M. M. Wong, *An Introduction to Pseudo-differential Operators* (World Scientific, Singapore, 2nd ed., 1999.) This careful introductory text has a very similar aim and scope as the book by Saint Raymond.
3. G. B. Folland, *Introduction to Partial Differential Equations* (Princeton University Press, Princeton, NJ, 2ed, 1995.)  
The last chapter of this book (in the 2nd ed. only) provides an introduction to pseudodifferential operators—a precise and readable exposition similar to the book of Saint Raymond, however, using local estimates on the symbols.
4. L. Hörmander, *The Analysis of Linear Partial Differential Operators III, Pseudo-differential operators*. (Corrected reprint of the 1985 original, Grundlehren der Mathematischen Wissenschaften, Springer, Berlin, 1994.)  
A classic text; chapter 18 provides a tight introduction with precise but terse proofs; tough but worth the effort!
5. J. Chazarain, A. Piriou, *Introduction to the Theory of Linear Partial Differential Equations*. (Studies in Mathematics and its Applications, 14. North-Holland Publishing, Amsterdam, 1982.)  
Chapter 3 and 4 of this book provide an exposition of symbols, oscillatory integrals and pseudodifferential operators. The theory is put into a geometric context right from the start hence requires some knowledge of differential geometry.
6. A. Grigis, J. Sjöstrand, *Microlocal analysis for differential operators. An introduction*. (London Mathematical Society Lecture Note Series, 196. Cambridge University Press, Cambridge, 1994.)  
General introduction to microlocal analysis and the calculus with pseudodifferential and Fourier integral operators. Stresses the geometric context of the theory and provides a broad discussion of propagation of singularities. Not an easy read!
7. F. Trèves, *Introduction to pseudodifferential and Fourier integral operators. Vol. 1. Pseudodifferential operators*. (The University Series in Mathematics, Plenum Press, New York, 1980.)  
The first volume of this two-volume book covers pseudodifferential operators and has a very broad spectrum. The details are not always easy to be filled in...
8. M. Shubin, *Pseudodifferential operators and spectral theory*. (Springer, Berlin, nd ed, 2001.)  
This classic book—the first Russian edition already appeared in 1978—focuses more on the functional analytic aspects of the theory and, in particular, the spectral properties of pseudodifferential operators.