Books on Operator Algebras and prerequisites

26.1.2009

1 General Topology

- Chapter 1 of G. Bredon: Topology and Geometry. Springer GTM. (Very nice, contains most of general topology one ever needs.)

- Chapter 1 of G. Pedersen: Analysis Now. Springer GTM. (Complements previous reference.)

- V. Runde: A taste of topology. Springer Universitext. (Nice and readable textbook.)

- R. Engelking: General topology. Heldermann Verlag. (Very comprehensive, very useful for reference.)

2 Functional analysis

- G. Pedersen: Analysis Now. Springer GTM. (Beautiful, highly recommended.)

- J. B. Conway: A course in functional analysis. Springer GTM. (More comprehensive than Pedersen.)

- W. Rudin: Functional analysis. (Abstract approach: From the general to the particular.)

- M. Reed and B. Simon: Functional analysis. [Vol. 1 of series on mathematical physics.] (Nice, somewhat eclectic.)

- P. Lax: Functional analysis. (Quite different from preceding references. Many applications to classical analysis.)

3 Operator algebras

3.1 Overviews

- Chapter V of A. Connes: Noncommutative Geometry. Ca. 90 p. (Very inspiring.)

- Chapter 2 of O. Bratteli and D. Robinson: Operator algebras and quantum statistical mechanics. Vol. 1. Ca. 150 pages. Springer. (Brief crash course for aspiring mathematical physicists.)

- R. Bhat (ed.): Lectures on operator theory. AMS. (Mixed quality, but nice for a first impression.)

- B. Blackadar: Operator algebras. Theory of C^*-algebras and von Neumann algebras. Springer. (500 pages of results, but few proofs.)

3.2 Textbooks on C^*- and von Neumann algebras

- J. Dixmier: C^*-algebras. (Still very useful, in particular on applications to representation theory.)

- J. Dixmier: Von Neumann algebras. (Quite outdated, since no modular theory.)

- S. Sakai: C^*-algebras and W^*-algebras. Springer. (Rather brief.)

- R. V. Kadison and J. R. Ringose: Fundamentals of the theory of operator algebras. Vols. 1 & 2. (Thorough, but rather slow pace.)

- G.J. Murphy: C^*-Algebras and operator theory. Academic Press. (Very accessible and readable.)

- G. Pedersen: C^*-algebras and their automorphism groups. (Good, but little on vN algebras.)

- M. Takesaki: Theory of operator algebra, vol. 1. (Very authorative, but proofs could be more transparent.)

- M. Takesaki: Theory of operator algebra, vol. 2. (Mostly modular theory and applications)

- M. Takesaki: Theory of operator algebra, vol. 3. (Nuclear C^*-algs, hyperfinite vNAs, classification results.)

- S. Stratila and L. Zsido: Lectures on von Neumann algebras. Abacus press 1979. (Very useful introduction to vNAs, bypassing the C^*-algs. Out of print and almost impossible to find.)

- S. Stratila: Modular theory. Abacus press, 1981. Out of print. (Takesaki's vol. 2 is preferable.)

- K. Davidson: C^*-algebras by example. AMS. (Useful example-based approach.)

3.3 K-and KK-Theory. E-theory

- Wegge-Olsen

- B. Blackadar

- M. Rordam et al: An introduction to K-theory for C*-algebras. CUP.

- N. Higson and Roe: Analytic K-Homology. OUP.

- K.K. Jensen and K. Thomsen: Elements of KK-theory.

3.4   Noncommutative geometry

- A. Connes: Noncommutative Geometry.

- Gracia-Bondia, J.C. Varilly and H. Figueroa: Elements of noncommutative geometry. Birkhäuser.

- Khalkali and M. Marcolli (eds.): An invitation to NCG

- A. Connes and M. Marcolli: Noncommutative geometry, quantum fields and motives. AMS

- J.C. Varilly: An introduction to NCG. EMS

- N. Higson, J. Roe (eds.): Surveys in noncommutative geometry. AMS

3.5   Subfactors

- V.F.R. Jones: Subfactors and knots. AMS

- V.F.R. Jones and Sunder:

- D.E. Evans and Y. Kawahigashi: Quantum symmetries on operator algebras. OUP.