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Maximal L_p -regularity for parabolic equations, Fourier multiplier theorems and H^∞ -functional calculus. (English) [Zbl 1097.47041](#)

Iannelli, Mimmo (ed.) et al., Functional analytic methods for evolution equations. Based on lectures given at the autumn school on evolution equations and semigroups, Levico Terme, Trento, Italy, October 28–November 2, 2001. Berlin: Springer (ISBN 3-540-23030-0/pbk). Lecture Notes in Mathematics 1855, 65-311 (2004).

The paper under review is a set of lecture notes on recent progress in the functional analytic approach to maximal regularity for parabolic evolution equations with extensive applications to maximal L_p -regularity of large classes of partial differential operators and systems. The authors describe two approaches to maximal regularity: singular integrals and H^∞ -calculus. They provide effective Mihlin multiplier theorems in UMD-spaces, and as a consequence, characterize maximal regularity in terms of R -boundedness. Then the theory is applied to classical operators, elliptic systems, boundary value problems, and divergence type elliptic operators. In the second part, the authors construct an H^∞ -calculus of sectorial operators, characterize its boundedness, provide connections with the “operator sum” method and with R -boundedness. They prove the boundedness of the H^∞ -calculus for various classes of differential operators. An appendix provides the necessary background on fractional powers of sectorial operators.

For the entire collection see [\[Zbl 1052.47002\]](#).

Reviewer: [V. A. Liskevich \(Bristol\)](#)

MSC:

- [47D06](#) One-parameter semigroups and linear evolution equations
- [47A60](#) Functional calculus for linear operators
- [34G10](#) Linear differential equations in abstract spaces
- [35D10](#) Regularity of generalized solutions of PDE (MSC2000)
- [35J55](#) Systems of elliptic equations, boundary value problems (MSC2000)
- [35K20](#) Initial-boundary value problems for second-order parabolic equations
- [35K90](#) Abstract parabolic equations
- [42B20](#) Singular and oscillatory integrals (Calderón-Zygmund, etc.)

Cited in **4** Reviews
Cited in **196** Documents

Keywords:

[parabolic equations](#); [maximal regularity](#)