
Zbl 1206.35004**Taylor, Michael E.****Partial differential equations. III: Nonlinear equations. 2nd ed.** (English)

Applied Mathematical Sciences 117. New York, NY: Springer. xxii, 715 p. EUR 99.95/net; £ 86.50; SFR 148.00 (2011). ISBN 978-1-4419-7048-0/hbk; ISBN 978-1-4419-7049-7/ebook

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The third of three volumes on partial differential equations is devoted to nonlinear PDEs. It treats a number of equations of classical continuum mechanics, including relativistic versions, as well as various equations arising in differential geometry, such as in the study of minimal surfaces, isometric imbedding, conformal deformation, harmonic maps, and prescribed Gauss curvature. In addition, some nonlinear diffusion problems are studied. It also introduces such analytical tools as the theory of L^p Sobolev spaces, Hölder spaces, Hardy spaces, and Morrey spaces, and also a development of Calderón-Zygmund theory and paradifferential operator calculus. In this third volume there are six chapters.

Chapter 13 is devoted to function space and operator theory for nonlinear analysis.

Chapter 14 concerns nonlinear elliptic equations (DeGiorgi-Nash-Moser theory for variational operators, Krylov-Safonov estimates for nonvariational operators, Monge-Ampère equation, Leray-Schauder fixed point theorem).

Chapter 15 analyses nonlinear parabolic equations (reaction diffusion equations, Trotter product formula and Moser iteration method).

Chapter 16 is focused on nonlinear hyperbolic equations (Cauchy-Kowalewsky theorem, conservation laws and Riemann problem).

Chapter 17 is devoted to incompressible fluids governed by Navier-Stokes equations.

Chapter 18 concerns Einstein's gravitational equation and Schwarzschild solution.

The book is targeted at graduate students and at professional mathematicians with an interest in partial differential equations, mathematical physics, differential geometry, harmonic analysis, and complex analysis.

In this second edition, there are a new appendix in Chapter 13 and there are two new sections in Chapter 17. Moreover several other sections have been substantially rewritten, and numerous others polished to reflect insights obtained through the use of these books over time.

*Vincenzo Vespri (Firenze)**Keywords* : operator theory; nonlinear analysis; new sections*Classification* :

- ***35-01** Textbooks (partial differential equations)
- 35-02** Research monographs (partial differential equations)
- 35J60** Nonlinear elliptic equations
- 35K55** Nonlinear parabolic equations
- 35L60** First-order nonlinear hyperbolic equations
- 35L70** Second order nonlinear hyperbolic equations

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35Q31

83C05 Einstein's equations