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Nota di contenuto	1. Introduction -- 2. Second order linear elliptic equations -- 3. A bit of functional analysis -- 4. Weak derivatives and Sobolev spaces -- 5. Weak formulation of elliptic PDEs -- 6. Technical results -- 7. Additional results -- 8. Saddle points problems -- 9. Parabolic PDEs -- 10. Hyperbolic PDEs -- Appendix A: Partition of unity -- Appendix B: Lipschitz continuous and smooth domains -- Appendix C: Integration by parts for smooth functions and vector elds -- Appendix D: Reynolds transport theorem -- Appendix E: Gronwall lemma -- Appendix F: Necessary and sucient conditions for the well-posedness of the variational problem.
Sommario/riassunto	This textbook is devoted to second order linear partial differential equations. The focus is on variational formulations in Hilbert spaces. It contains elliptic equations, including the biharmonic problem, some useful notes on functional analysis, a brief presentation of Sobolev spaces and their properties, some basic results on Fredholm alternative

and spectral theory, saddle point problems, parabolic and linear Navier-Stokes equations, and hyperbolic and Maxwell equations. Almost 80 exercises are added, and the complete solution of all of them is included. The work is mainly addressed to students in Mathematics, but also students in Engineering with a good mathematical background should be able to follow the theory presented here. This second edition has been enriched by some new sections and new exercises; in particular, three important equations are now included: the biharmonic equation, the linear Navier-Stokes equations and the Maxwell equations. .