The foundations of the theory of semigroups of operators were established in the first half of the twentieth century as a formalization of the view emphasized by A. Hadamard that an autonomous deterministic system is described by a one-parameter semigroup of transformations. Hence, the theory was first designed as a functional analytic language of partial differential equations but soon also proved to be an important tool in stochastic processes, involving mathematicians like W. Feller in developing its basics. One could say that the theory of semigroups reached its maturity in the fourth and fifth decades of the previous century, when the major generation theorems were established thanks to the work of K. Yosida, E. Hille, R.S. Phillips, I. Miyadera, and, of course W. Feller. It attained its first apex with the publication of the famous book *Functional Analysis and Semi-Groups* by E. Hille and R.S. Phillips, which reflected its predominantly functional-analytic character. Since then, semigroup theory has been rapidly developing as a theory “in itself”, posing new and fascinating internal questions, but also it has been reaching out to applications ranging from the classical ones such as partial differential equations and stochastic processes to less standard such as integro-differential and functional-differential equations, quantum mechanics, population biology, or control theory. Furthermore, though inherently linear and autonomous, semigroup theory proved indispensable in describing both nonlinear and nonautonomous evolutionary phenomena. Thanks to intensive research, the theory reached some state of perfection in the last decades of the previous century and the wealth of the amassed results, both theoretical and applied, has been reflected in a series of excellent books presenting the state of the art in the field and complementing the fundamental treatise of E. Hille and R.S. Phillips. These include monographs by E.B. Davies, A. Belleni-Morante, A. Pazy, J.A. Goldstein, and K.J. Engel and R. Nagel, which present the functional analytic point of view, and by S.N. Ethier and T.G. Kurtz, W. Feller and E.B. Dynkin, which are instrumental in understanding the role of semigroups in Markov processes. These authors were largely responsible for bringing the theory to the current state and we are pleased to note that a survey paper of J.A. Goldstein and R. Nagel is one of the cornerstones of the presented volume.
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