

Contents

1	Elliptic operators in $L^p(\mathbb{R}^N)$: characterization of the domain	19
1.1	Assumptions and statement of the main results	20
1.2	Operators with globally Lipschitz drift coefficient and bounded potential term	23
1.3	A priori estimates of $\ Vu\ _p$, $\ Du\ _p$ and $\ D^2u\ _2$	30
1.4	A priori estimates of $\ D^2u\ _p$, $\ \langle F, Du \rangle\ _p$	36
1.5	Generation of a C_0 -semigroup in $L^2(\mathbb{R}^N)$	43
1.6	Generation of a C_0 -semigroup in $L^p(\mathbb{R}^N)$	46
1.7	Comments and consequences	49
2	Gradient estimates in Neumann parabolic problems in convex regular domains	53
2.1	Assumptions and preliminary results	55
2.2	Construction of the associated semigroup	59
2.3	Pointwise gradient estimates	67
2.4	Consequences and counterexamples	73
3	Gradient estimates in Dirichlet parabolic problems in regular domains	81
3.1	Assumptions and main result	82
3.2	Existence and uniqueness	83
3.3	Some a-priori estimates	85
3.4	An auxiliary problem	88
3.5	Proof of Theorem 3.1.2	92
3.6	Examples and applications	93
4	On the domain of some ordinary differential operators in spaces of continuous functions	95
4.1	Preliminary results	96
4.2	Characterization of the domain	98
4.2.1	The case of $C_b(\mathbb{R})$	98
4.2.2	The case of $C(\overline{\mathbb{R}})$	99
4.2.3	Examples	101
5	Invariant measures: main properties and some applications	103
5.1	Existence and uniqueness of invariant measures for Feller semigroups	104
5.2	Feller semigroups and differential operators	114
5.2.1	Preliminary results	115
5.2.2	Invariant measures	120
5.3	Characterization of the domain of a class of elliptic operators in $L^p(\mathbb{R}^N, \mu)$	125

A	Maximum principles	133
B	Smooth domains and regularity properties of the distance function	141
C	Some a priori estimates	143
C.1	A Schauder type parabolic estimate	143
C.2	An L^p elliptic estimate	145