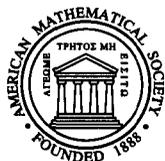


AMERICAN MATHEMATICAL SOCIETY
COLLOQUIUM PUBLICATIONS
VOLUME 43

Fully Nonlinear Elliptic Equations

Luis A. Caffarelli
Xavier Cabré



American Mathematical Society
Providence, Rhode Island

Contents

Introduction	1
1. Preliminaries	5
1.1. Basic Notation and Terminology	5
1.2. Tangent Paraboloids and Second Order Differentiability	6
2. Viscosity Solutions of Elliptic Equations	11
2.1. Viscosity Solutions	12
2.2. The Class S of Solutions of Uniformly Elliptic Equations	14
2.3. Examples of Fully Nonlinear Elliptic Equations	17
Notes	19
3. Alexandroff Estimate and Maximum Principle	21
3.1. Alexandroff-Bakelman-Pucci Estimate	21
Notes	28
4. Harnack Inequality	29
4.1. Two Important Tools	29
4.2. Harnack Inequality	31
4.3. C^α Regularity	37
5. Uniqueness of Solutions	43
5.1. Jensen's Approximate Solutions	43
5.2. Uniqueness for $F(D^2u) = 0$	45
5.3. $C^{1,\alpha}$ Regularity for $F(D^2u) = 0$	46
5.4. Applications to Concave Equations	48
Notes	49
6. Concave Equations	51
6.1. Evans-Krylov Theorem	51
6.2. $C^{2,\alpha}$ Regularity for $F(D^2u) = 0$	54
7. $W^{2,p}$ Regularity	59
7.1. $W^{2,p}$ Estimates	59
8. Hölder Regularity	73
8.1. $C^{2,\alpha}$ Estimates	73
8.2. $C^{1,\alpha}$ Estimates	78

9. The Dirichlet Problem for Concave Equations	85
9.1. Bernstein's Technique	85
9.2. $C^{2,\alpha}$ Estimate up to the Boundary for $F(D^2u) = 0$	88
9.3. The Dirichlet Problem	95
Bibliography	99
Index	103