

CONTENTS

INTRODUCTION	6
CHAPTER 1. SOME FUNCTIONAL SPACES AND PRELIMINARY RESULTS	12
1.1. H_w -spaces	12
1.2. Some auxiliary inequalities	24
1.3. Deviation of matrices and the dispersion of eigenvalues	32
CHAPTER 2. WEAK SOLUTIONS OF QUASILINEAR ELLIPTIC SYSTEMS	50
2.1. The universal iteration process for nondegenerate systems with bounded nonlinearities	50
2.2. Degenerating systems with bounded nonlinearities	61
2.3. Regularization of the universal iteration process	67
CHAPTER 3. REGULARITY OF SOLUTIONS OF THE FIRST BOUNDARY VALUE PROBLEM FOR QUASILINEAR SECOND ORDER ELLIPTIC SYSTEMS	75
3.1. Some estimates for ordinary differential operators	75
3.2. Probe functions and basic inequalities	83
3.3. The Hölder condition for solutions of nondegenerate systems with bounded nonlinearities	92
3.4. Differentiability of the solution for second order elliptic systems	99
CHAPTER 4. REGULARITY OF SOLUTIONS FOR ELLIPTIC SYSTEMS OF THE ORDER 2ℓ	119
4.1. The Hölder condition for derivatives of the order $\ell-1$	119
4.2. Boundedness of iterations in $W_2^{(\ell, \ell)}$	129
4.3. The Hölder condition for derivatives of the order ℓ	136
CHAPTER 5. FOURTH ORDER QUASILINEAR ELLIPTIC SYSTEMS	144
5.1. Principal results and inequalities for successive approximations	144

5.2.	The probe function and the auxiliary function $\bar{z}(x)$	148
5.3.	Some estimates for the auxiliary function $\bar{z}(x)$	162
5.4.	Convergency of the universal iteration process in $C^{\bar{\nu}}$ and $C^{\bar{\nu}, \bar{\nu}}$. The Hölder condition for the solution and its derivatives	184
5.5.	The Hölder condition for the first derivatives of solutions for second order systems	185
CHAPTER 6.	THE SHARPNESS OF THE REGULARITY CONDITIONS FOR SOLUTIONS OF SECOND AND FOURTH ORDER SYSTEMS	190
6.1.	Second order systems and the sharpness of the Hölder condition for their solutions	190
6.2.	The sharpness of the Hölder condition for the gradient of solutions for fourth order systems	192
6.3.	The sharpness of the Hölder condition for solutions of fourth order systems	199
REFERENCES		201