## CONTENTS

Int	rodu <b>c</b>	tion	IV	
§1.	ELEMENTARY PROPERTIES OF FILTERS			
	1.1	Filters and filter-basis	1	
	1.2	Comparison of filters on the same space	2	
	1.3	Mappings into direct products	2	
	1.4	Images of filters under mappings	3	
	1.5	An inequality between images of filters	4	
<b>§</b> 2.	PSEUDO-TOPOLOGICAL VECTOR SPACES			
	2.1	Pseudo-topological spaces	6	
	2.2	Continuity	8	
	2.3	Induced structures	8	
	2.4	Pseudo-topological vector spaces	12	
	2.5	Quasi-bounded and equable filters	15	
	2.6	Equable pseudo-topological vector spaces	19	
	2.7	The associated locally convex topological vector space	21	
	2.8	Equable continuity	24	
	2.9	Continuity with respect to the associated structures	30	
<b>§</b> 3.	DIFFERENTIABILITY AND DERIVATIVES			
	3.1	Remainders	32	
	3.2	Differentiability at a point	35	
	3.3	The chain rule	38	
	3.4	The local caracter of the differentiability condition	38	
§4.	EXAMPLES AND SPECIAL CASES			
	4.1	The classical case	42	
	4.2	Linear and bilinear maps	43	
	4.3	The special case f: R→E	44	

	4.4 Differentiable mappings into a direct product	46
<b>§</b> 5.	FUNDAMENTAL THEOREM OF CALCULUS	50
	5.1 Formulation and proof of the main theorem	50
	5.2 Remarks and special cases	58
	5.3 Consequences of the fundamental theorem	60
§6.	PSEUDO-TOPOLOGIES ON SOME FUNCTION SPACES	65
	6.1 The spaces $B(E_1; E_2)$ , $C_0(E_1; E_2)$ and $L(E_1; E_2)$	65
	6.2 Continuity of evaluation maps	69
	6.3 Continuity of composition maps	71
	6.4 Some canonical isomorphisms	<b>7</b> 2
§7.	THE CLASS OF ADMISSIBLE VECTOR SPACES	82
	7.1 The admissibility conditions	82
	7.2 Admissibility of E	84
	7.3 Admissibility of subspaces, direct products and	
	projective limits	85
	7.4 Admissibility of $B(E_1; E_2)$ , $C_0(E_1; E_2)$ , $L_p(E_1; E_2)$	87
<b>§</b> 8.	PARTIAL DERIVATIVES AND DIFFERENTIABILITY	90
	8.1 Partial derivatives	90
	8.2 A sufficient condition for (total) differentiability	91
<b>§</b> 9.	HIGHER DERIVATIVES	93
	9.l f" and the symmetry of f"(x)	93
	9.2 f <sup>(p)</sup> for p ≥ 1	95
§10	. C <sub>k</sub> -MAPPINGS	99
	10.1 The vector space C <sub>k</sub> (E <sub>1</sub> ;E <sub>2</sub> )	99
	10.2 The structure of C <sub>k</sub> (E <sub>1</sub> ;E <sub>2</sub> )	101
	10.3 C → (E <sub>1</sub> ;E <sub>2</sub> )	104
	10.4 Higher order chain rule	105

311.	THE COMPOSITION OF C <sub>k</sub> -MAPPINGS		110
	11.1	The continuity of the composition map	110
	11.2	The differentiability of the composition map	114
<b>§</b> 12.	DIFFE	RENTIABLE DEFORMATION OF DIFFERENTIABLE MAPPINGS	131
	12.1	The differentiability of the evaluation map	131
	12.2	The linear homeomorphism	
		$C^{*}(E_1; C^{*}(E_2; E_3)) \sim C^{*}(E_1 \times E_2; E_3)$	132
APPE	NDIX		137
NOTA	TIONS		140
INDEX			143
	RENCES		146