

Contents

1	Preliminaries	1
1.1	Triangular Norms	1
1.2	Triangular Norms on Lattices	5
1.3	Distribution Functions	6
1.4	Fuzzy Sets	7
2	Generalized Spaces	11
2.1	Random Normed Spaces	11
2.2	Random Topological Structures	17
2.3	Random Functional Analysis	31
2.4	Non-Archimedean Random Normed Spaces	41
2.5	Fuzzy Normed Spaces	43
3	Stability of Functional Equations in RN-Spaces Under Spacial t-Norm	47
3.1	Cauchy Additive Equations	47
3.2	Quadratic Functional Equations	51
3.3	Cubic Functional Equations	56
3.4	Quartic Functional Equations	60
4	Stability of Functional Equations in RN-Spaces Under Arbitrary t-Norms	63
4.1	Cauchy Additive Equations	63
4.2	Cubic Functional Equations	65
4.3	Quartic Functional Equations	71
5	Stability of Functional Equations in RN-Spaces via Fixed Point Methods	81
5.1	m -Variable Additive Functional Equations	82
5.2	Quartic Functional Equations	87
5.3	ACQ Functional Equations	89
5.3.1	The Generalized Hyers–Ulam Stability of the Functional Equation (5.3.1): An Odd Case	89

5.3.2	The Generalized Hyers–Ulam Stability of the Functional Equation (5.3.1): An Even Case	100
5.4	AQCQ Functional Equations	104
5.4.1	The Generalized Hyers–Ulam Stability of the Functional Equation (5.4.1): An Odd Case via Fixed Point Method	104
5.4.2	The Generalized Hyers–Ulam Stability of the Functional Equation (5.4.1): An Even Case via Fixed Point Method	116
6	Stability of Function Equations in Non-Archimedean Random Spaces	125
6.1	Cubic Functional Equations	125
6.2	Quartic Functional Equations	129
6.3	Another Quartic Functional Equations	134
6.4	Mixed AQCQ Functional Equations	139
6.4.1	The Generalized Hyers–Ulam Stability of the Quartic Functional Equations (6.4.1) in Non-Archimedean RN-Spaces: An Odd Case	139
6.4.2	The Generalized Hyers–Ulam Stability of the Functional Equation (6.4.1) in Non-Archimedean RN-Spaces: An Even Case	147
7	Stability of Functional Equations Related to Inner Product Spaces	153
7.1	AQ Functional Equations	153
7.1.1	The Generalized Hyers–Ulam Stability of the Functional Equation (7.1.1): An Odd Case	154
7.1.2	The Generalized Hyers–Ulam Stability of the Functional Equation (7.1.1): An Even Case	159
7.2	Non-Archimedean Lattice RN-Spaces	163
7.2.1	The Hyers–Ulam Stability of Functional Equations in Non-Archimedean Lattice Random Spaces	163
8	Random Banach Algebras and Stability Results	175
8.1	Random Homomorphisms	175
8.1.1	The Stability of Random Homomorphisms in Random Normed Algebras	176
8.1.2	The Stability of Random Derivations on Random Normed Algebras	181
8.2	Cauchy–Jensen Functional Equations in Banach \ast -Algebras	184
8.2.1	The Hyers–Ulam Stability of Cauchy–Jensen Functional Equations in Induced Random C^\ast -algebras	191
8.2.2	The Hyers–Ulam Stability of Cauchy–Jensen Functional Inequalities in Random Banach \ast -Algebras and Induced Random C^\ast -Algebras	194

8.3	Random $*$ -Derivations in Banach $*$ -Algebras	198
8.3.1	The Stability of Homomorphisms and Derivations in Non-Archimedean Random C^* -Algebras	199
8.3.2	The Stability of Homomorphisms and Derivations in Non-Archimedean Lie C^* -Algebras	203
9	Related Results on Stability of Functional Inequalities and Equations	207
9.1	Latticetic Stability of the Functional Inequalities	207
9.2	Systems of QC and AQC Functional Equations	215
9.3	Couple Functional Equations	227
	References	235
	Index	245

Stability of Functional Equations in Random Normed
Spaces

Cho, Y.J.; Rassias, T.M.; Saadati, R.

2013, XIX, 246 p., Hardcover

ISBN: 978-1-4614-8476-9