1. Record Nr. UNINA9910878974603321

Autore	Resnick Sidney
Titolo	The Art of Finding Hidden Risks : Hidden Regular Variation in the 21st Century
Pubbl/distr/stampa	Cham : , : Springer, , 2024 ©2024
ISBN	9783031575990 9783031575983
Edizione	[1st ed.]
Descrizione fisica	1 online resource (272 pages)
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Nota di contenuto	Intro -- Preface -- Acknowledgements -- Contents -- 1 Foundation -- 1.1 Leaving the Comfort of the Real Line -- 1.2 TABOF Spaces -- 1.2.1 Examples of TABOF Spaces -- 1.2.2 Generating TABOF Spaces -- 1.2.2.1 Examples for Products of TABOF Spaces -- 1.3 The Forbidden Zone and the BA Class -- 1.4 Measures on TABOF Spaces: The Space M (SF)=M(S F) -- 1.4.1 A Topology on M(SF) -- M-convergence -- 1.4.1.1 Test Functions -- 1.4.1.2 Topology and Convergence -- 1.4.1.3 Metrizability -- 1.4.2 Equivalent Forms of Convergence -- the Portmanteau Theorem -- 1.4.3 Taking the Definitions for a Test Drive -- 1.5 New Results from Existing Ones: Mapping Theorems -- 1.5.1 The Problem and Context -- 1.5.2 The First Mapping Theorem -- 1.5.3 The Second Mapping Theorem and Uniform Continuity -- 1.5.4 Examples for Uniform Continuity -- 1.5.4.1 The CUMSUM Map in R+ -- 1.5.4.2 The Projection Map on R+ -- 1.6 Maneuvers Around Roadblocks -- 1.6.1 More Subtle Use of Compactness -- 1.6.2 Restriction of the State Space -- 1.6.2.1 Restriction -- 1.6.2.2 Convergence Reduced to Weak Convergence of Finite Measures -- 1.7 Problems -- 2 Regular Variation of Measures -- 2.1 Regular Variation of Measures in M(S F) -- 2.1.1 Measures on R+ -- 2.1.2 More on Scaling -- 2.1.2.1 Examples of Scaling Functions -- 2.1.3 Definition of Regular Variation of Measures -- 2.1.3.1 Examples of Regular Variation -- 2.2 Building Regularly Varying Distributions -- 2.2.1 Constructing

Regularly Varying Distributions in R+p and Moving Between Cartesian and Polar Coordinates -- 2.2.2 Construction of Regular Variation on SF Using the Generalized Polar Coordinate Transform -- 2.2.2.1 Generalized Polar Coordinates -- 2.2.2.2 Construction of Regular Variation on SF Using GPOLAR -- 2.2.2.3 Examples -- 2.3 How to Prove Regular Variation of Measures? -- 2.3.1 Proof Method 1: Great Oaks From Little Acorns Grow.
2.3.1.1 Combining Regular Variation Properties -- The First Binding Lemma -- 2.3.1.2 Combining Regular Variation Properties -- The Second Binding Lemma -- 2.3.2 Proof Method 2: Map Your Way to Happiness by Using the Great(er) Oaks and the Mapping Theorems -- Some Examples -- 2.3.2.1 The One-Jump Principle: Lebron vs Peewee (But Who Is Who?) -- 2.3.2.2 Products and the Space D -- Spice in the Dish -- 2.3.2.3 Breiman's Theorem -- 2.3.2.4 A Special Case of Breiman's Theorem Applied to a Tauberian Theorem -- 2.3.2.5 Binding Plus Mapping Gives a Version of Karamata's Theorem on Integration -- 2.3.2.6 Binding Plus Mapping Gives a Multivariate Version of Karamata's Tauberian Theorem -- 2.3.3 Proof Method 3: Reduce Problems in R to Finite Dimensions -- 2.3.3.1 Regular Variation in R+ -- What Happens in R+ Stays in R+ -- 2.3.3.2 The Tail Process of a Random Sequence Whose Distribution Is Regularly Varying -- 2.3.4 Proof Method 4: Prove Convergence on a Sufficiently Rich Class of Sets -- 2.3.4.1 Example: S F=R+p{0p} for Some p1 -- 2.3.4.2 Example: S F=R+{0} -- 2.3.4.3 Example: D= (R+) (R+{0})=R+2[x-axis] -- 2.3.4.4 Example: S F=R+2 [axes] -- 2.4 Problems -- 3 Hidden Regular Variation -- 3.1 Hidden Regular Variation -- 3.1.1 Simple Diagnostics for HRV in R+p, p&gt -- 1 -- 3.1.1.1 Regular Variation in R+p{0p} -- Reduction to One-Dimension -- 3.1.1.2 Regular Variation in R+p[axes] -- 3.1.1.3 Additional HRV Examples -- 3.2 Steroidal Regular Variation: Roid Rage Strikes -- 3.2.1 Steroidal Regular Variation in R+ for the iid Model -- 3.2.1.1 What Happens when We Apply CUMSUM? -- 3.2.2 Poisson Points as Random Elements of R+ -- 3.2.2.1 Hidden Regular Variation: The Big Reveal -- 3.2.3 Different Tail Rates in Different Directions -- 3.3 Problems -- 4 Lévy Processes with Regularly Varying Distributions: Where Do the Jumps Go? -- 4.1 Background.
4.1.1 Skorohod Metric -- 4.1.2 The Lévy Process X -- 4.1.2.1 Regular Variation Assumption -- 4.1.2.2 Itô Representation -- 4.1.2.3 Representation of the Poisson Random Measure -- 4.1.2.4 Notation Review -- 4.2 Steroidal Regular Variation of P[X ·] -- 4.2.1 The Plan -- 4.2.2 The Mapping -- 4.2.2.1 Properties of the Map Tm -- 4.2.2.2 Ta-dah! The Payoff for J: Steroidal Regular Variation -- 4.2.3 Filling the Gap: Sweating the Small Stuff to Get Regular Variation of P[X·] -- 4.2.3.1 Negligibility of X"0365X -- 4.2.3.2 Putting Humpty Dumpty Back Together: Comparing X and J -- 4.2.3.3 Proof of Corollary 4.1 -- 4.3 Heavy Lifting Done? Time for a Cruise -- 4.3.1 First Cruise Stop: The Supremum Functional -- 4.3.2 Second Cruise Layover: The Largest Jump Functional -- 4.3.2.1 Suspense! Does Regular Variation of the Lévy Process Distribution Imply Regular Variation of the Extremal Process Distribution? -- 4.3.2.2 Bonus: Regular Variation of the Lévy Measure, the Lévy Process Distribution and the Extremal Process Distribution -- 4.3.2.3 Steroidal Regular Variation of the Extremal Process Distribution -- 4.3.3 Next Cruise Stop: Smoothing -- 4.3.3.1 Dressing for the Cruise Interlude -- 4.4 Problems -- 5 Exploring Data Cautiously -- 5.1 Reasons for Caution: Zombies and Fairy Tales -- 5.2 Threshold Selection -- 5.2.1 The Minimum Distance Threshold Method -- 5.2.1.1 Beware of Mischief -- 5.2.1.2 MDSP Test Drives with Data -- 5.3 Two-Dimensional Visualization of Multivariate Dependence -- 5.3.1 The Diamond Plot -- 5.3.1.1 Consistency Suggested by the Diamond

Plot: Beware of More Mischief -- 5.3.1.2 Making Use of Sliders -- 5.4 Evidence Consistent with Multivariate Regular Variation from Hillish Analysis -- 5.4.1 Hillish Analysis for Heavy Tails on R+2{0} -- 5.4.1.1 Oops! About that Continuity Assumption… -- 5.4.2 Hillish Examples. 5.4.2.1 Example 1: Simulation Where the Sample Size may be Too Small -- 5.4.2.2 Example 2: Simulation with Bigger Sample Size -- 5.4.2.3 Example 3: Oil Returns -- 5.4.2.4 Example 4: Facebook Wall Posts -- 5.5 Beyond R2{0}: Other Cones as Forbidden Zones -- 5.5.1 Parameterizing a Cone -- 5.5.2 A Coordinate System for Regular Variation on R+2[wedge] -- 5.5.3 Hillish Analysis for Heavy Tails in R+2[wedge] -- 5.5.4 Further Analysis of Facebook Data -- 5.5.4.1 Marginal Heavy Tails -- 5.5.4.2 Dependence Analysis -- 5.5.4.3 Is There Regular Variation on R+2[wedge]? -- 5.5.4.4 What About [&lt -- wedge]? -- 5.6 More on Asymptotic Independence -- 5.6.1 Definitions and Basics -- 5.6.2 Preservation of Asymptotic Independence Under Mappings: What Could Possibly Go Wrong? -- 5.6.2.1 A Partial Converse Giving Asymptotic Independence -- 5.7 Measuring Extremal Dependence with the EDM -- 5.7.1 Exploring Pairwise Extremal Dependence with the Dependence Graph -- 5.7.1.1 Example of How to Ferret Out the Strongest Dependencies -- 5.7.2 Hang on! Is the Estimated EDM Asymptotically Normal? -- 5.7.2.1 The Clunk Function g (·) -- 5.7.2.2 Proof of Tightness: How to Avoid Crushing a Ninja -- 5.7.3 Unclunking the Clunk Function g(·) -- 5.7.3.1 Asymptotic Independence -- 5.7.3.2 Strong Dependence -- 5.7.3.3 The Angular Measure S Concentrates on Two Disjoint Subintervals -- 5.7.3.4 Asymptotic Full Dependence -- 5.7.4 Is Relying on Asymptotic Normality Wise? -- 5.7.4.1 Simple Simulation Example -- 5.7.4.2 What About Real Data Mr. Smarty Pants? -- 5.7.5 Preferential Attachment with Reciprocity Gives Asymptotic Full Dependence -- 5.7.5.1 Description of the Model -- 5.7.5.2 Where Are the Heavy Tails? -- 5.7.5.3 But What Is the Data? The Slippery Issue of the Double Limit -- 5.7.5.4 A Controlled Experiment: Simulation of the Network -- 5.8 Problems.
A A Crash Course on Regularly Varying Functions -- A.1 Preliminaries from Analysis -- A.1.1 Uniform Convergence -- A.1.2 Inverses of Monotone Functions -- A.1.3 Convergence of Monotone Functions -- A.1.4 Cauchy's Functional Equation -- A.2 Regular Variation: Definition and First Properties -- A.3 A Maximal Domain of Attraction -- A.4 Regular Variation: Deeper Results -- Karamata's Theorem -- A.4.1 Uniform Convergence -- A.4.2 Integration and Karamata's Theorem -- A.4.3 Karamata's Representation -- A.4.4 Differentiation -- A.5 Regular Variation: Further Properties -- B Notation Summary -- References -- Index.