Cambridge University Press & Assessment 978-1-009-35145-4 — Fixed Point Theory and Variational Principles in Metric Spaces Qamrul Hasan Ansari, Daya Ram Sahu Index More Information

Index

 (ε, α) -uniformly locally contraction mapping, 30 Ψ -contraction set-valued mapping, 95 ψ -contraction mapping, 42 ε -chain, 30 ε -chainable metric space, 30 ε -contractive, 33 ε -net, 10 ε -solution, 149 *m*-periodic point, 160

almost fixed point property, 122 anti-cyclic set-valued map, 158 anti-quasimonotone bifunction, 141 antimonotone bifunction, 135 approximate ε -solution, 104

Banach contraction principle, 28, 114 Bolzano-Weierstrass property, 10 Borwein-Preiss variational principle, 123 boundary point, 6 bounded function, 11 above, 11 below, 11 bounded set, 4 Boyd-Wong fixed point theorem, 42

Cantor's intersection theorem, 8 Caristi's fixed point theorem, 49, 114 Caristi–Kirk fixed point theorem, 162 Caristi-Kirk fixed point theorem, 91, 116 Cauchy sequence, 7 Cauchy-Schwarz inequality, 202 Clarke's fixed point theorem, 115 closed set, 6 closed sphere, 4 closure, 5 compact space, 10 complete metric space, 7 continuous function, 11 uniformly, 12 contraction constant, 24 contraction map, 24 contractive map, 24 contractivity constant, 24 convergent sequence, 6 cover, 9 open, 9 cyclically anti-quasimonotone bifunction, 141 cyclically antimonotone bifunction, 138 cyclically monotone bifunction, 138 cyclically quasimonotone bifunction, 141

d-point, 52 delay differential equation, 174 dense set, 8 everywhere, 8 derived set, 5 DHM theorem, 97 diameter of a set, 4 directional Ψ-contraction set-valued map, 120 directional contraction, 115 discrete metric space, 1 dissipative set-valued map, 92 distance between a point and a set, 4 distance between sets, 4

Ekeland's variational principle converse, 109 extended, 144, 162 strong form, 104, 106 weak form, 109 entropy, 92 weak, 92 eqigraph, 15 equilibrium problem, 133 equivalent metric spaces, 9 equivalent metrics, 9 Extended Ekeland's variational principle, 144, 146

CAMBRIDGE

Cambridge University Press & Assessment 978-1-009-35145-4 — Fixed Point Theory and Variational Principles in Metric Spaces Qamrul Hasan Ansari, Daya Ram Sahu Index

More Information

218 Index

finite intersection property, 10 finite subcover, 10 fixed point, 21, 85 fixed point problem, 21, 135 Fredholm integral equation, 186 gap function, 164 gauge-type function, 123 generalized Picard iteration, 97 Green's function, 176 Hölder's inequality, 202 Hausdorff distance, 74 hypograph, 15 interior of a set, 5 interior point, 4 intersectionally closed set-valued map, 159 inverse function, 59 isolated point, 5 limit point, 5, 6 linear mixed Volterra-Fredholm integral equation, 196 Lipschitz constant, 24 Lipschitz continuous function, 24 locally contraction mapping, 30 lower bound, 205 lower level set, 15 lower semicontinuous function, 13, 15 from above, 16 maximal element, 159, 205 metric, 1 discrete, 1 equivalent, 9 Hausdorff, 74 space, 1 metric projection, 59 metric space, 1 complete, 7 equivalent, 9 minimization problem, 134 Minkowski's inequality, 202 Minkowski's inequality for infinite sums, 203 Mizoguchi-Takahashi fixed point theorem, 95 multivalued map, 56

Nadler's fixed point theorem, 129 Nadler's theorem, 86 Nash equilibrium problem, 134 neighborhood of a point, 5 nonexpansive map, 24 nonlinear Fredholm integral equation, 190 nonlinear mixed Volterra-Fredholm integral equation, 197 nonlinear Volterra-Fredholm integral equation, 193 Oettli-Théra theorem, 162 open neighborhood, 5 open set, 5 open sphere, 4 orbit, 87 regular, 87 partial ordering, 205 partially ordered set, 205 periodic point, 33 Picard theorem, 173 proper function, 103 pseudometric, 3 pseudometric space, 3 quasimetric, 3 quasimetric space, 3 quasimonotone bifunction, 141 reducible finite cover, 10 saddle point problem, 134 second-order two-point boundary-value problem, 176 segment, 115 separable space, 8 sequence bounded, 7 Cauchy, 7 convergent, 6 sequentially compact set, 10 sequentially compact space, 10 set-valued contractive mapping, 87 set-valued directional contraction map, 88 set-valued map, 56 Ψ-contraction, 95 H-continuous, 82 anti-cyclic, 158 bounded, 72 closed, 68 continuous, 66

CAMBRIDGE

Cambridge University Press & Assessment 978-1-009-35145-4 — Fixed Point Theory and Variational Principles in Metric Spaces Qamrul Hasan Ansari, Daya Ram Sahu Index

More Information

Index 219

contraction, 85 contractive. 87 directional Ψ -contraction. 120 directional contraction, 88 dissipative, 92 hyperinjective, 59 intersectionally closed, 159 inverse, 61 Lipschitz, 85 lower semicontinuous, 65 nonexpansive, 85 quasi-surjective, 59 upper semicontinuous, 64 weakly contraction, 96 weakly dissipative, 92 stationary point, 97 subcover, 10 Takahashi's minimization theorem, 126

Takahashi's minimization theorem, 126 extended, 151, 162 totally bounded space, 11 totally ordered set, 205 trajectory, 87, 92 unbounded set, 4 uniformly continuous function, 12 upper bound, 205 upper level set, 15 upper semicontinuous function, 13, 15 from below, 16 right, 17

variational inequality problem, 135 Volterra integral equation linear, 183 nonlinear, 184 Volterra integral equations, 182

weak sharp minima, 130 weakly contraction mapping, 45 weakly contraction set-valued mapping, 96 weakly dissipative set-valued map, 92 Weierstrass's extreme value theorem, 204 Weierstrass's theorem, 204

Zorn's lemma, 205