

CONSTANT SELECTIONS AND MINIMAX INEQUALITIES

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Abstract

In this paper, we establish two constant selection theorems for a map whose dual is upper or lower semicontinuous. As applications, matching theorems, analytic alternatives, and minimax inequalities are obtained.

Keywords: map, constant selection, acyclic map, matching theorem, analytic alternative, minimax inequality.

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REFERENCES

- [1] J. Andres and L. Górniewicz, *Topological Fixed Point Principles for Boundary Value Problems*, Kluwer Academic Publishers 2003.
- [2] J.P. Aubin and J. Ekeland, *Applied Nonlinear Analysis*, A Wiley-Interscience Publications, John Wiley & Sons Inc., New York 1984.
- [3] M. Balaj, *Admissible maps, intersection results, coincidence theorems*, *Comment. Math. Univ. Carolinae* **42** (2001), 753–762.
- [4] R.C. Bassanezi and G.H. Greco, *A minimax theorem for marginally u.s.c./l.s.c. functions*, *Topol. Methods Nonlinear Anal.* **5** (1995), 249–253.
- [5] C. Berge, *Espaces Topologique*, Edinburgh, London, Oliver and Boyd 1963.
- [6] T.-H. Chang and C.-L. Yen, *KKM property and fixed point theorems*, *J. Math. Anal. Appl.* **203** (1996), 224–235.

- [7] L. Górniewicz, *Topological Fixed Point Theory of Multivalued Mappings*, Kluwer Academic Publishers, 1999.
- [8] Ky Fan, *Sur une théorème minimax*, C. R. Acad. Sci. Paris **259** (1964), 3925–3928.
- [9] Ky Fan, *A minimax inequality and its applications*, in "Inequality III" (O. Shisha, ed.), pp. 103–113, Academic Press, New York 1972.
- [10] Ky Fan, *Some properties of convex sets related to fixed point theorems*, Math. Ann. **266** (1984), 519–537.
- [11] A. Granas and F.-C. Liu, *Quelques théorèmes de minimax sans convexité*, C. R. Acad. Sci. Paris **300** (1985), 347–350.
- [12] A. Granas and F.-C. Liu, *Coincidences for set-valued maps and minimax inequalities*, J. Math. Pures Appl. **65** (1986), 119–148.
- [13] C.-W. Ha, *Minimax and fixed point theorems*, Math. Ann. **248** (1980), 73–77.
- [14] C.-W. Ha, *On a minimax inequality of Ky Fan*, Proc. Am. Math. Soc. **99** (1987), 680–682.
- [15] L.-J. Lin, *Applications of a fixed point theorem in G -convex spaces*, Nonlinear Anal. **46** (2001), 601–608.
- [16] F.-C. Liu, *A note on the von Neumann-Sion minimax principle*, Bull. Inst. Math. Acad. Sinica **6** (1978), 517–524.
- [17] E. Michael, *Continuous selections I*, Ann. Math. **63** (2) (1956), 361–381.
- [18] E. Michael, *A theorem on semi-continuous set-valued functions*, Duke Math. J. **26** (1959), 647–651.
- [19] S. Park, *Generalizations of Ky Fan's matching theorems and their applications*, J. Math. Anal. Appl. **141** (1989), 164–176.
- [20] S. Park, *Generalized Fan-Browder fixed point theorems and their applications*, in "Collection of Papers Dedicated to J.G. Park", pp. 51–77, 1989.
- [21] S. Park, *Some coincidence theorems for acyclic multifunctions and applications to KKM theory*, in "Fixed Point Theory and Applications" (K.-K. Tan, Ed.), pp. 248–277, World Scientific, River Edge, New Jersey 1992.
- [22] S. Park, *Foundations of the KKM via coincidences of composites of upper semicontinuous maps*, J. Korean Math. Soc. **31** (1994), 493–519.
- [23] S. Park, *Acyclic versions of the von Neumann and Nash equilibrium theorems*, J. Comput. Appl. Math. **113** (2000), 83–91.
- [24] H.K. Pathak and M.S. Khan, *On D -KKM theorem and its applications*, Bull. Austral. Math. Soc. **67** (2003), 67–77.
- [25] M. Sion, *On general minimax theorems*, Pacific J. Math. **8** (1958), 171–176.

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