

Solution existence of general variational inequalities and coincidence points

ALIREZA AMINI-HARANDI and SZILÁRD LÁSZLÓ

ABSTRACT.

In this paper, by using a simple technique, we obtain several existence results of the solutions for general variational inequalities of Stampacchia type. We also show, that the existence of a coincidence point of two mappings is equivalent to the existence of the solution of a particular general variational inequality of Stampacchia type. As applications several coincidence and fixed point results are obtained.

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REFERENCES

- [1] Aussel, D. and Hadjisavvas, N., *On quasimonotone variational inequalities*, J. Optim. Theory Appl., **121** (2004), No. 2, 445-450
- [2] Baiocchi, C. and Capelo, A., *Variational and quasi-variational inequalities*, Wiley, New York, (1984)
- [3] Bensoussan, A. and Lions, J. L., *Applications des inequations variationnelles en control et stochastiques*, Dunod, Paris, (1978)
- [4] Bertsekas, D. P. and Gafni, E. M., *Projection methods for variational inequalities with applications to the traffic assignment problem*, Math. Prog. Study, **17** (1982), 139-159
- [5] Dafermos, S., *Exchange price equilibria and variational inequalities*, Math. Programming, **46** (1990), 391-402
- [6] Ferrentino, R., *Variational inequalities and optimization problems*, Appl. Math. Sci., **1** (2007), 2327-2343
- [7] Fichera, G., *Problemi elastostatici con vincoli unilaterali: il problema di Signorini con ambigue condizioni al contorno*, Atti Accad. Naz. Lincei, Mem. Cl. Sci. Fis. Mat. Natur. Sez. Ia, **7** (8), (1963-1964), 91-140
- [8] Kinderlehrer, D. and Stampacchia, G., *An Introduction to Variational Inequalities and Their Applications*, Academic Press, New York, 1980
- [9] László, S., *Some existence results of solutions for general variational inequalities*, J. Optim. Theory Appl., **150** (2011), 425-443
- [10] László, S., *Existence of solutions of inverted variational inequalities*, Carpathian J. Math., **28** (2012), 271-278
- [11] Maugeri, A. and Raciti, F., *On existence theorems for monotone and nonmonotone variational inequalities*, Journal of Convex Analysis, **16** (2009), 899-911
- [12] Noor, M. A., *General variational inequalities*, Appl. Math. Lett., **1** (1988), 119-121
- [13] Rus, I. A., Petruşel, A. and Petruşel, G., *Fixed Point Theory 1950-2000: Romanian Contributions*, House of the Book of Science, Cluj-Napoca, 2002
- [14] Salhi, N. and Taoudi, M. A., *Existence of integrable solutions of an integral equation of Hammerstein type on an unbounded interval*, Mediterr. J. Math., **9** (2012), 729-739
- [15] Stampacchia, G., *Formes bilineaires coercitives sur les ensembles convexes*, C. R. Acad. Sci. Paris, Sr I. Math., **258** (1964), 4413-4416
- [16] Takahashi, W. and Toyoda, M., *Weak convergence theorems for nonexpansive mappings and monotone mappings*, J. Optim. Theory Appl., **118** (2003), 417-428

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Corresponding author: Szilárd László; laszlosziszi@yahoo.com

DEPARTMENT OF PURE MATHEMATICS
UNIVERSITY OF SHAHREKORD
SHAHREKORD 88186-34141, IRAN
SCHOOL OF MATHEMATICS
INSTITUTE FOR RESEARCH IN FUNDAMENTAL SCIENCES (IPM)
P.O. BOX:19395-5746 TEHERAN, IRAN
E-mail address: aminih.a@yahoo.com

DEPARTMENT OF MATHEMATICS
TECHNICAL UNIVERSITY OF CLUJ NAPOCA
MEMORANDUMULUI 28, 400114 CLUJ-NAPOCA, ROMANIA
E-mail address: laszloszisi@yahoo.com