A CLASS OF HEMIVARIATIONAL INEQUALITY PROBLEMS INVOLVING NONMONOTONE MAPPINGS

Yuying Zhou [1],   Lijing Xi [2]   and Gang Li [3]

[1]Department of Mathematics,
Soochow University, Suzhou 215006, China
Corresponding author email: yuyingz@suda.edu.cn

[2] Department of Mathematics and Physics,
Suzhou University of Science and technology, Suzhou 215009, China

[3] School of Sciences,
Zhejiang A & F University, Hangzhou 311300, China

Abstract. In this paper, we are concerned with the existence solutions of a hemivariational inequality for a class of $(S)_+$ mapping and a generalized pseudomonotone mapping. As an application, we obtain a nonlinear elliptic hemivariational inequality problem has a solution.

Keywords. Hemivariational inequality; generalized gradient; generalized pseudomonotone mapping; elliptic; $(S)_+$ mapping.

AMS (MOS) subject classification: 47J20; 35J45

References

[1] R.A. Adams, Sobolev Spaces. Academic Press, New York, 1975.

[2] F.H. Clarke, Optimization and Nonsmooth Analysis. John Wiley-interscience, New York, 1983.

[3] N. Costea, and V. Rădulescu, Existence results for hemivariational inequalities involving relaxed $\eta - \alpha$ monotone mappings, *Commun. Appl. Anal* **13**(2009), 293-304.

[4] N. Costea,and V. Rădulescu, Hartman-Stampacchia results for stably pseudomonotone operators and nonlinear hemivariational inequalities, *Appl. Anal.* **89**(2)(2010), 175-188.

[5] Z. Dályay, and C. Varga, An existence result for hemivariational inequalities, *Electronic J. Differential Equations,* **2004**(2004), 1-17.

[6] Y.S. Huang and Y.Y. Zhou, Existence of solutions for a class of hemivariational inequality problems, *Comput. Math. Appl.* **57** (2009), 1456-1462.

[7] Y.S. Huang and Y.Y. Zhou, Multiple solutions for a class of nonlinear elliptic problems with a p-Laplacian type operator, *Nonlinear Anal.,* **72** (2010), 3388–3395.

[8] P. Lindqvist, On the equation div$(|\nabla u|^{p-2}\nabla u) + \lambda |u|^{p-2}u = 0$, *Proc. Amer. Math. Soc.* **109** (1990), 157–164.

[9] Z.H. Liu, Some existence theorems for evolution hemivariational inequalities, *J. Pure Appl. Math.* **34**(8)(2003), 1165-1176.

[10] D. Motreanu and V. Radulescu, *Variational and non-variational methods in nonlinear analysis and boundary value problems*, Kluwer Academic Publishers, Dordrecht-Boston-London, 2003.

[11] M.A. Noor, Hemivariational inequalities, *J. Appl. Math. Computing* **17**(2005), 59-72.

[12] D. Pacaliand S. Sburlan, *Nonlinear Mappings of Monotone Type.* Sijthoff & Noordhoff, România, 1978.

[13] P.D. Panagiotopoulos, Hemivariational inequalities, applications in mechanics and engineering. Springer, Berlin, 1993.

[14] N.S. Papageorgiou and F. Papalini, Pairs of positive solutions for the periodic scalar p-Laplacian *J. Fixed Point Theory Appl.* **5**(2009), 157-184.

[15] R. Xiao and Y.Y. Zhou, Multiple solutions for a class of semilinear elliptic variational inclusion problems, *J. Ind. Manag. Optim.,* **7** (2011), 991–1002.

http://monotone.uwaterloo.ca/∼journal/